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MOTOR AGE

BAY STATE TEXT BOOK FOR ROAD MAKERS

CONCRETE BRIDGE CONSTRUCTED BY MASSACHUSETTS HIGHWAY COMMISSION TO COMPLETE A ROAD

By James T. Sullivan

BOSTON, MASS., Dec. 21—Massachusetts has expended upon its highways in 15 years more than $7,000,000. That is the reason why the Bay state is so famed for its splendid roads. Because the money was spent judiciously under the authority of trained men, the commonwealth has received a splendid return in the way of increased traffic, primarily making it easier and less expensive for the farmer to bring his loads to market; thereby in a measure returning to him part of the money he pays in taxes, but also in attracting thousands of pleasure-seekers who have scattered money lavishly in the state.

These fine roads have helped to boom the motor industry and in that way, too, they have increased business, which means more money for state taxation so that it is money well spent. It is the old proverb—"money makes money"—exemplified.

Massachusetts Is Schoolmaster

So Massachusetts has been regarded by its sister states as the schoolmaster in road building for its reports and other publications of its highway commission are eagerly sought as textbooks by others following in its footsteps. With Massachusetts thus setting an example, the other New England states have followed in its wake somewhat tardily, but yet doing something, so that eventually there will be a system of trunk lines all over New England.

It was in 1892 that the question of good roads in Massachusetts was first broached to the legislature. At that time a board was appointed to consider the question and the report submitted after long consideration was something of a classic. Two years later the legislature got busy and appointed a commission comprised of trained men, made an appropriation and gave the authority to begin operations.

800 Miles of Highway

There has been constructed since that time nearly 800 miles of state highway while under the small towns act many more miles have been rebuilt. The commission mapped out a system for the state that will eventually reach a total mileage of something like 1,700 miles of state highway, so that now nearly one-half is practically completed. The commissioners are Harold Parker, chairman; John H. Manning, William D. Sohier, A. B. Flekher, secretary.

Not only does the commission build roads, but it also constructs bridges, cleans up and beautifies roadsides wherever new roads have been constructed, and it has planted thousands of trees along the highways because it has been found that the shade is beneficial.

Editor's Note—This is the first of a series of articles on the road improvement situation in New England. In succeeding articles Maine, Vermont, New Hampshire, Rhode Island and Connecticut will be dealt with. The importance of the road situation in these states is made doubly interesting because of the recent congress of governors of these states, in which plans for an interstate road scheme throughout New England were hinted at.

sachusetts has spent on highways since the commission was organized. This does not include nearly $500,000 spent in Boston and Lynn in special work.

CONSTRUCTION

1894	$ 300,000	1902	$ 500,000
1895	400,000	1903	150,000
1896	600,000	1904	450,000
1897	800,000	1905	500,000
1898	400,000	1906	450,000
1899	500,000	1907	500,000
1900	500,000	1908	450,000
1901	500,000		

MAINTENANCE

1903	$ 40,000	1907	$ 105,000
1904	50,000	1908	230,000
1905	60,000		
1906	70,000	Total	$7,555,000

These figures show the great increase in maintenance in recent years. The larger cost is due in a great measure to motor cars. Of course the greater mileage of the present day must be taken into account, and likewise the severe winter weather in Massachusetts. Part of this money has been spent in experimenting with various sorts of roads and with different things to preserve them, all of which helps eat up an appropriation.

The Massachusetts Law.

Under the Massachusetts law, while the original expense of state highways is paid out by the commonwealth, one-fourth of the expenditure in any county for improvements must be paid back to the state within 6 years, with interest, by the county where the work was done. On the completion of a state highway the road is maintained by the highway commission, but the municipalities retain police jurisdiction over the road, and may make temporary necessary repairs without notifying the

state board. Provision is made in the law for the repair of state highways by contracts with the municipalities in which they are located, or with private persons, and such contracts can be made without advertisement.

Cities and Towns Pay

The cities and towns pay for the cost of maintenance up to the limit of $50 a mile a year. Any expenditure in excess of this amount a mile is borne by the commonwealth. After the highways are completed the commonwealth becomes liable for injuries sustained by persons traveling thereon in the same manner and subject to the conditions provided by the statutes relating to roads other than state highways. The state assumes entire control of the whole width of the highway between the property lines, and its duties are not completed when the traveled way is built, as is the case in some of the other states. Provision is made in the law for the payment of damages sustained by persons whose property has been taken for or has been injured by the construction of a state highway. Cities and towns, however, may by vote agree to indemnify the commonwealth.

Small Towns Are Aided

The small towns are aided, too, throughout the state so that this means additional roads improved that are not part of the great trunk lines going across the state in either direction. These roads are not all of macadam, to be sure, but they are well built, regraded and surfaced until they are in fine shape. Under an act of 1900 the commission may, on petition of the selectmen of a town of not less than $1,000,000 valuation, expend on the town's road a sum not exceeding 40 per cent of the town's average annual appropriation for 5 years preceding. Five per cent of the board's annual appropriation may be spent thus. In towns of more than $1,000,000 valuation, the town must raise a sum equal to that granted it by the board, which may spend another 5 per cent of its appropriation on towns of this class. This

SOUTH HADLEY ROAD BEFORE BEING IMPROVED

was done because the small towns, off the main roads, felt that they were not getting proper benefit out of the state's road building. The small towns get the benefit of the state engineers' services and advice and also the use of steam road rollers and portable stone crushers. The state has seventeen rollers and several portable crushers.

The small towns are availing themselves of the chance to get help for their roads more and more every year. There has been a general education of the people of the state in road building in the past few years, and the value of scientifically-built roads is known in every community. Erroneous impressions of the cost of modern roads have been removed, and even in the smallest towns it is seen that a good road is the cheapest in the end.

Authority of Commission

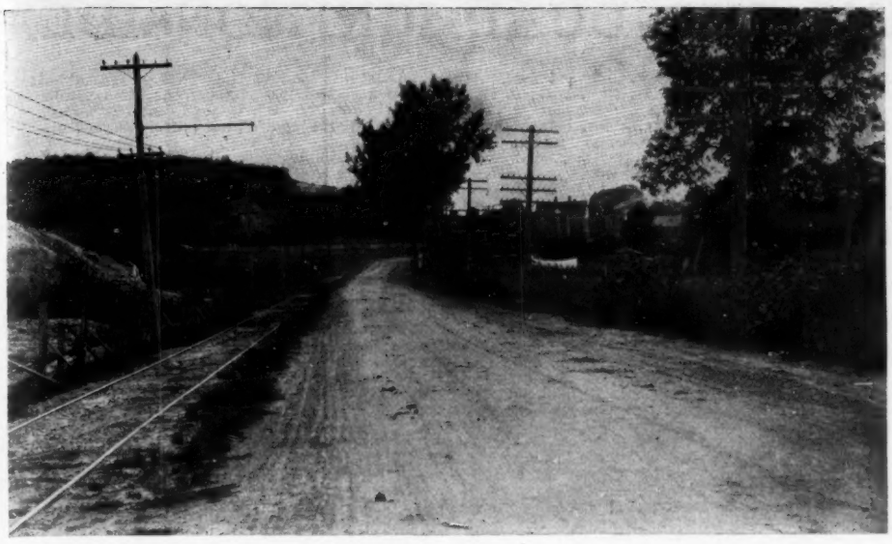
Under the Massachusetts law the commission has authority to build any road which is petitioned for by the selectmen of towns or the mayor and aldermen of cities, and from its determination no appeal can be made. After years of experience and study the commission has devised a complete system of the roads throughout the entire state, and has, from its knowledge of the adjoining states, fixed upon points where it should connect with them. Having studied all conditions of soil and topography the commission has reached a fairly reliable method of construction under different conditions.

The state is divided into five divisions, over each of which a division engineer has control. His duty is to take charge of the construction and maintenance of every state highway, bridge or culvert within his division, and he is held responsible for the carrying out of contracts and the well-being of his division. The method of designing any road is as follows: Upon the commission's determining that any road should be taken as a state highway, a party of surveyors is sent into the field to make a careful survey of the road itself. The notes of this survey are worked up in the main office of the commission, and accurate plans, profiles and cross-sections are plotted from them. Upon the plan and profile thus made the engineer in charge of the office draws in pencil a tentative location and grade for the state highway. The plan, profile and cross-sections are then sent to the division engineer, who is required to make a report upon the proposed location and grade of the road, and to give the location and size of culverts, all the necessary drains, the character of the soil on which the road is to be built, his recommendations as to the material at hand, and whether any part or the whole is to have a foundation either of stone or gravel, what the cross-section of the macadam is to be, and what kind of stone is to be used, whether local or trap.

Estimates Are Prepared

Upon the plans thus made, and the report of the engineer, a carefully-made estimate of quantities and costs is prepared for the use of the commission, and upon this report and plan contracts and specifi-

NEAR LENOX, SHOWING IMPROVEMENT ON SIDES AS WELL AS ROAD ITSELF



SOUTH HADLEY ROAD AFTER IMPROVEMENTS

cations are prepared and submitted to bidders.

Ordinarily, the lowest bidder is accepted to do the work, although the commission does not hesitate to reject the bid of any contractor who is known to be incompetent or otherwise unfit. Under the contract and specifications the road is built, and every detail is watched by an inspector, under the division engineer. Neither the division engineer nor any other person, except the commission itself, can make any modification in a contract or specifications after the contract is awarded. The same care is taken whether a town or city takes the contract or whether the work is done by a private contractor. They are all required to come up to the same standard of excellence; and, if any failure of a road occurs, it must be due to faulty design rather than to execution.

The usual requirements in the building of a stone road are briefly as follows: Upon a properly-constructed sub-grade the broken stone is laid in courses. The largest No. 1 stone, which must pass through the 2½-inch mesh in the screen, is placed at the bottom; the No. 2 stone, which passes through the 1¼-inch mesh, next; and the stone screenings and dust on top. These three courses are each rolled to the satisfaction of the engineer, and the top course, when the dust is put on, is flushed with water during the process of rolling, so that the finer particles are carried into the spaces between the stones.

Suits Local Conditions

The commission in its design has determined that the question of foundation is subject wholly to the local conditions—that is to say, in a clay soil or a soil that is composed of alluvium or very fine sand, a stone foundation is necessary. The ordinary method is to make the V-shaped trench in the road under the whole or a part of the portion to be surfaced with macadam, the deepest part of the trench being in the center of the roadway. The depth and width of this trench varies with the conditions. The ordinary cost of these foundations is about 90 cents or $1 per cubic yard in place. This trench is filled with hand-placed stones not over 8 inches in their longest diameter, brought to a true cross-section at the sub-grade, the smaller stones being placed at the top. These stones should be so small that they will not permit the broken stone used for surfacing to escape into the stone foundation. Where the underneath soil is of gravel or coarse sand, no foundation whatever is necessary. It very often happens that a coarse gravel may well take the place of the stone in foundations. Lateral drains are constructed at proper intervals to take the water from the V-shaped stone foundation.

Hardened Surface Necessary

The specifications for the ordinary country road call for a hardened surface 15 feet wide, of either gravel or macadam, with a shoulder of 3 feet on each side, conforming to the cross-section of the hardened way, thus making a traversible road 21 feet wide. This marks the location of gutters on either side, and the embankment either in cut or fill beyond this is at a slope of one and one-half to one.

Building Culverts

It has been found that the most economical method of building culverts in Massachusetts is by using reinforced concrete; or, where small pipe culverts are necessary, reinforced concrete ends are built. The reason for this is that with the reinforced concrete very much thinner walls can be built, and the cost of transporting materials is very much reduced. It has been found that for bridges reinforced concrete beams can be used economically and safely up to a span of from 30 to 40 feet, and that over that length the span arch construction should be adopted. A bridge built of concrete, when properly constructed, with a concrete floor, offers the vast advantage of giving a permanent structure which requires no repair.

Care of Roadside

It has been the practice of the commission to use much care in the roadside work, both in removing unsightly earth, stone and other obstructions and objectionable trees or brush, and to thin out and cut the native growth so as to produce a roadside growth which is not only ornamental but advantageous. It is recognized that a certain amount of shade on any road is beneficial to the road and also agreeable to the senses. For this reason, the commission has established a nursery for the growth and propagation of many kinds of trees which are later transplanted to the roadsides to beautify them.

The money received for registrations will be turned over to the highway commission this year, and the legislature will make another large appropriation to carry on the good work.

It will be remembered that the Massachusetts roads were very highly complimented by the American delegates to the international road congress in Paris after they had a chance to compare them with European highways.

BEAUTIFUL STRETCH OF WINDING HIGHWAY IN LEE, MASS.

APPERSON CLAIMS THE DUAL IGNITION IDEA

CHICAGO, Dec. 21—Eternally events repeat, and it is now claimed that the patent situation will take on exciting phases due to the presence of another "basic patent," or a patent with such broad claims as to give to the owners a monopoly in so far as dual ignition systems are concerned in conjunction with internal combustion motors such as are used in motor car work.

Elmer Apperson, of Apperson Brothers Automobile Co., Kokomo, Ind., partially by acquiring the patent issued to F. E. Canda, January 17, 1899, and by taking out another patent in his own name, has built up what is claimed to be a strong situation. The Canda patent is No. 617,806. and the Apperson patent is No. 905,625, which later patent was issued December 1 this year. These patents, as the further information here given will show, relate to dual ignition systems as are in use on nearly every motor car on the market at the present time employing the double system.

Features of Patents

To what extent this situation will complicate matters is a question that the future will have to decide, and as to the merits of the patents enough it is to say that they hold until they are upset by a court of competent jurisdiction, and not before. In the meantime, it is not too much to anticipate that the present owners of the patents will endeavor to realize upon their holdings. With a view to showing, in the most accurate manner possible, just what these patents amount to, the preamble and the claims of each will be given in full. Since the Canda patent was issued first, it will be first exposed to view, as follows:

My invention relates to improvements in gas and oil engines, and particularly to improvements in electric igniting and speed-regulating mechanism for such engines.

My invention consists in employing a plurality of igniting devices for each engine cylinder and operating, by preference, a plurality of such igniting devices during each working stroke of the cylinder, so as to insure the production of a spark by some one of the igniting devices during each working stroke; in providing separate circuits and batteries for the separate igniting devices of each engine cylinder and switches by which one or more of the batteries may be disconnected or connected with a different set of igniting devices from that to which it is ordinarily connected, thus making it possible to locate or bridge over any defect in the operation of the igniting mechanism which may occur during the operation of the engine; in so arranging the several igniting devices of each engine cylinder that ignition may be produced at different periods in the stroke, thus making it possible by throwing one or more of the igniting devices of each engine cylinder out of circuit to vary the speed of the engine, and in the novel combination, construction and arrangement of the parts.

The objects of my invention are, first, to provide an igniting mechanism which shall more certainly ignite the explosive charges of oil and gas engines than the igniting devices heretofore in use; second, to provide means for locating defects in the operation of the igniting mechanism and for bridging over such defects without interfering with the operation of the engine; third, to provide simple means for varying the speed of the engine which may be operated at a distance from the engine.

Claims of the "Canda" Patent

1. An igniting mechanism for the working cylinders of gas and oil engines, comprising a plurality of separate electrical igniting devices having separate circuits, means for supplying current thereto and means for throwing said igniting devices into and out of action, and for throwing each into action independently of the others, substantially as described.

2. An igniting mechanism for the working cylinders of gas and oil engines, comprising a plurality of separate electrical igniting devices, having separate circuits, means for supplying current thereto, and switches in said circuits for throwing each igniting device into and out of action independently of the others, substantially as described.

3. An igniting mechanism for the working cylinders of gas and oil engines, comprising a plurality of separate electrical igniting devices having separate circuits and separate electrical generators, and switches in said circuits adapted to throw each igniting device into and out of circuit with its own generator and also into and out of circuit with the generator of a different igniting device, substantially as described.

4. A speed-regulating mechanism for gas and oil engines, comprising a plurality of separate electrical igniting devices, adapted to ignite the charges at different periods in the stroke, and means for throwing the several igniting devices into and out of action, at will, substantially as described.

5. In an internal-combustion engine, the combination with an engine cylinder, of a plurality of separate electrical igniting devices for said cylinder, set to ignite the charges at different periods in the stroke, and having separate circuits and separate electrical generators, and switches in said circuits adapted to throw each igniting device into and out of circuit with its own generator, and also into and out of circuit with a generator of a different igniting device, substantially as described.

6. In an electrical igniting mechanism for gas and oil engines, the combination, with a camshaft within the engine cylinder, a series of cams thereon and staggered with reference to each other, and means for rotating said shaft, of a series of movable pins opposite said cams, means for pressing said pins toward and against said cams, and means for limiting the motion of the pins, said pins being insulated from the cams except at the points of contact, substantially as described.

The Canda patent, in itself, does not seem to be all that would be required in order to establish the monopoly such as any inventor is entitled to if his invention is such as to breed an exclusive right. It will be necessary, then, to examine the Apperson patent in order to find the broad ground on which to establish the claims that are now being made by the present owner of the two patents.

Apperson Declaration

My invention relates to explosion engines of the type used in motor cars, and has as an object the provision of means for overcoming the necessity of removing the ignition plugs from the cylinders to clean the contacts carried thereon when they become covered with oil, soot or other undesirable deposit.

It has heretofore been the practice to supply the cylinders of engines of the above type with one ignition plug, and it has been necessary to remove this plug and wipe or scrape the contents carried thereon in order to clean them. In my present invention I provide two such plugs entering the explosion cavity of the cylinder at different points. I also provide two distinct electric circuits—one connected with each of the plugs, and means for using the circuits and plugs separately so that the plugs may be used alternately, whereby, when the ignition contacts upon one plug become coated with oil, so that the spark does not pass properly, the other plug may be thrown into use and the explosions occurring therefrom may be allowed to burn the oil or other deposit from the contacts of the plug just abandoned.

In carrying out my invention, I preferably use electric circuits of different character associated with the different plugs—that is, when used in connection with motor cars I prefer to connect one of the plugs with a battery circuit and the other with a magneto-generator circuit. I also preferably arrange these circuits so that they may both be used at once, as it may frequently occur in an engine comprising a plurality of cylinders that one of the plugs of one cylinder may become coated, while the opposite plug of another cylinder may become coated, so that in order that all cylinders may explode properly, it is necessary to use both of the electric circuits at once.

The claims of the Apperson patent are as follows:

1. An explosion engine having a cylinder in which the explosive is adapted to ignite, a pair of spark plugs extending into the cylinder, a magneto, electrical connections from the magneto to one of the spark plugs, a battery, separate electrical connections from the battery to the second spark plug, and a switch for throwing the spark plugs into and out of operation.

2. An explosive engine having a cylinder in which the explosive is adapted to ignite, a pair of spark plugs extending into the cylinder, one of said spark plugs having a fixed spark gap, a magneto electrically conencted with one of the spark plugs, a battery electrically connected with the other spark plug, a periodic circuit interrupter in the connection to the spark plug having the fixed gap, and means to control the connections to the spark plugs.

3. An explosion engine having an explosion chamber with two spark plugs therein, a magneto electrically connected with one spark plug, a battery electrically connected with the other spark plug, adjustable timers in the respective circuits, and means for adjusting the timers similarly and simultaneously.

4. An explosion engine having a cylinder in which the explosive is adapted to ignite, a pair of permanent spark gaps within said cylinder, a magneto electrically connected to the terminals of one spark gap, a battery electrically connected to the terminals of the other spark gap, and circuit interrupting devices in each of said connections.

5. An explosive engine having a cylinder in which the explosive is adapted to ignite, a pair of spark plugs extending into the cylinder, a magneto in circuit with one of said spark plugs, an induction coil having its secondary in circuit with the other spark plug, and a battery in circuit with the primary of said induction coil.

Conclusions at this time would be futile. The whole matter will simply have to be threshed out in a businesslike way, or in the courts, if business acumen so dictates.

EUROPE'S SPORTING CALENDAR

Paris, Dec. 17—In accordance with a now established custom, advantage has been taken of the presence of delegates to the Paris salon to draw up a calendar for motoring events in 1909. At present the dates are only tentative, the interested parties being given until January 15 to make changes or additions. After this time all new events proposed must be on days that do not clash with the program now drawn up. In January the only important features are the Brussels show, held from the 16th to 25th, and the Turin salon, from January 30 to February 14. During February the Monaco motor boat and aeroplane races will be held; during March there will be a number of events on the Mediterranean coast, but none of them of more than local interest. There will be a small industrial and taxicab competition in the neighborhood of Paris from April 15 to 25, motor boat races will be held on the Sicilian coast on the 25th, and 4 days later the Sicilian voiturette race will be held. May 2 has been selected for the Targa Florio, in Sicily. Germany and Sweden will both hold industrial vehicle competitions during the month, the exact dates to be decided by mutual agreement. The Moscow-St. Petersburg road race will be held on May 26. June 10 to 18 will see the competition for the Prince Henry cup, in Germany; the Kiel regatta is fixed from June 24 to July 3, and Switzerland will hold an industrial vehicle competition on the same dates. The French grand prix has been scheduled for July 1 to 3, the first day probably being for weighing-in, and the two following days for the voiturette and big car races.

Ostend week will take place from the 13th to 17th, and from July 24 to August 2 Amiens will hold an exhibition for agricultural motor cars. Mont Ventoux will be climbed on September 5. Italy will have its great race under international rules at Bologna from 11th to 19th; Semmering hill, in Austria, will be climbed on September 19. Austria will hold a commercial vehicle competition from October 3 to 17, and the Automobile Club of France will have a similar demonstration and test from November 18 to 28.

OLDS DEAL RUMORED

Chicago, Dec. 23—A deal of considerable magnitude concerning the Olds Motor Works is reported in the daily papers from Lansing, Mich., but F. L. Smith, general manager of the company, when asked by Motor Age over the long distance telephone, declined to either deny or affirm the report. The story is as follows:

"Lansing, Mich., Dec. 22—It has just developed that the Olds Motor Works has lately entered the General Motors Co. of New Jersey, a $12, 500,000 corporation with $7,000,000 preferred stock, paying 7 per cent cumulative interest, and $5,000,000 common stock. Stockholders in this city have received notice that they may exchange their stock in the Olds Motor Works for stock in the General Motors Co., receiving $4 in preferred and $1 in common stock in the New Jersey corporation for each share of Olds Motor Works stock. It is stated that the offer was made for 75 per cent of the Olds Motor Works stock, but was not considered by the holders of a large majority of the stock until the proposition included the entire issue of Olds Motor Works stock, so that all the stockholders could have the same opportunity to exchange and be treated on exactly the same basis. It is said the General Motors Co. contemplates entering the motor car business on a large scale, realizing the economies possible in the business, both in making and in holding. No transfers of the property or assets of the Olds Motor Works is made. The corporation goes on as it has before, except it will be under the control of the General Motors Co., which acquired more than three-fourths of the entire stock and will elect new directors and officers."

WOULD IMPOUND CAR

Worcester, Mass., Dec. 21.—The first novelty in legislation to create a stir on Beacon Hill is a bill to lock up for 30 days a motor car that has upset the righteous but unwary citizen. The machine that does that is conclusively deemed to be guilty of assault and battery, and gets 30 days without trial. This is the effect of a measure which a determined looking man brought to Clerk Kimball of the house and asked to have it filed. Mr. Kimball told the man he would have to get some member of the legislature to introduce it. Under legal analysis the bill is not as wild as it seems.

NEW RACE RULES OUT

Briarcliff Cup Committee Radically Alters Conditions for Stock Chassis Event

New York, Dec. 22.—Supplying satisfactory rules for a stock chassis race is a task that requires patience, ingenuity and a conclusion in advance that the regulations will not be acceptable to all those who might care to participate. After the so-called "committee of motor car manufacturers" had announced the rules drawn up last week there was immediate objection from several quarters protesting against a maximum bore of 5¼ inches, a minimum weight of 2,600 pounds, and a minimum wheel base of 110 inches. It was immediately shown that these conditions would make the event a high-speed race and would compel concerns which had competed in the 1908 event to build special racing cars for the 1909 contest.

So pronounced were the objections that the committee met again at the Automobile Club of America and continued in session the whole afternoon. The final outcome was the announcement of new conditions providing for a maximum bore of 4⅝ inches and a maximum stroke of 6 inches for a four-cylinder engine, or, in other words, a total piston displacement of 403⅓ cubic inches. The revised wheelbase minimum calls for 118 inches and the minimum weight is reduced to 2,300 pounds.

Furthermore, the committee decided to ask the donor of the trophy, Walter W. Law, to agree to the changing of the conditions requiring that "the manufacturer of a car entered in the race shall have sold and delivered or have built and have had ready for delivery at least 30 days before the date of the contest in the year 1909 at least ten cars similar in every respect to the car offered for entry."

It is predicted that Mr. Law, who is now en route home from Europe, will not agree to rules which will entirely change the character of the race. According to Henry H. Law, his father gave the cup because he thought the manufacturers desired a stock car race, and because of this it is unlikely that he will accept the radical revisions.

The $5,000 solid gold cup offered by the Automobile Club of America for the grand prize race at Savannah, Ga., on Thanksgiving day, was formally presented to the winning Fiat Automobile Co. on Tuesday evening last. The ceremonies took place at the A. C. A., and were made notable by the presence of Mayor George W. Tiedeman, of Savannah, Ga., who did so much to insure the success of the race; Frank C. Battey, president of the Savannah Automobile Club; Harvey Granger, chairman of the committee on course, and W. B. Stillwell, treasurer of the southern organization. Robert Lee Morrell, chairman of the A. C. A. contest committee and referee of the Savannah race, made the presentation speech. The cup was received on behalf of the Fiat Automobile Co. by E. Rand Hollander. Three cheers were given during the evening for the victorious Fiat and the visiting guests from Savannah. Ralph de Palma, driver of one of the Fiat cars, was presented with a gold medal for having finished the event in which the other Fiat cars ran first and third.

The racer with which Wagner achieved his great victory was on exhibition and attracted great attention. Moving pictures of motoring events and light refreshments helped to pass away the evening very pleasantly. The gold cup will be a feature of the Fiat exhibit at the Grand Central palace show.

GROWTH OF FRENCH CLUB

Paris, Dec. 15—Three years ago the membership of the Touring Club of France was 98,000. At the annual meeting held in Paris this week President Ballif declared that the figures had now mounted up to 115,000, the largest number of any similar club or association in the world. The income for the year had been $221,718, and the net balance in hand on the year's work no less than $37,353. During the past 2 years a total of $2,400 has been given in subventions toward the construction of paths for cyclists in the neighborhood of Paris, and $6,000 has been contributed to the work of repaving the main roads leading out of Paris. This task has been undertaken by the government at a total cost of $600,000, with financial aid from the touring club and the Automobile Club of France. When completed the present roughly-paved highways out of the capital will have been replaced by perfectly smooth granite-paved roads suitable for heavy motor car traffic, and giving easy access to every part of France. One of the 115,000 who had written a violent article against the motor car was held up to scorn in the public meeting and was threatened with excommunication.

ISOTTA IS DISQUALIFIED

New York, Dec. 21—Jefferson de Mont Thompson, chairman of the Vanderbilt cup commission, announced last week that Clifford V. Brokaw's Isotta that finished second in the Vanderbilt cup race had been disqualified for being overweight. When the car was brought to the scales to be weighed before the race Herbert H. Lytle, driver of the car, had to remove the rack used to carry the spare tires and the heavy mud guard support in order to get the machine down under the maximum weight limit of 1,200 kilograms, or 2,644 pounds. On the day of the cup race, however, the tire rack was put back on the car, and when the Isotta again was weighed after it had finished second to the Locomobile, driven by George Robertson, the technical committee found Brokaw's car had exceeded the maximum weight limit.

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Uniform Contests and Penalties Are Needed

ALREADY plans are being discussed for road races in many parts of the country for the 1909 season. One is scheduled for early spring for the Briarcliff cup; Philadelphia will duplicate its successful park race; Lowell, it is expected, will continue its road meet; Chicago has embryo plans for a stock chassis meet; Savannah has decided on a race of some nature, and Long Island will have to promote one or two on its parkway. This is an appetizing program, one worth the best energies of makers, and one that should prove of immeasurable worth to makers and buyers.

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WHETHER these expected races will prove of value will depend on the regulations governing them. If the makers get together and decide on a certain cylinder size for all cars in these contests, so that cars competing in the Briarcliff will be the same motor power as those at Chicago, or at Philadelphia, or Savannah, then the races will prove valuable to the maker because the great reading public will know that in all contests the cars are struggling for supremacy under identical conditions. If there is no cylinder volume limit, the races will prove as valueless as some of the 1908 ones in which cars with very different cylinder volume competed, the big ones generally running away with the plum, while the little fellows made an excellent demonstration run.

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IF road races are to prove valuable they must be governed by uniform rules and regulations, not one set for Chicago, another set for New England, and a third for Georgia. Different rules in different localities result in confusion with those who are not on the ground and not familiar with the conditions. A Chicago enthusiast wonders why a certain make of car performed so poorly in New England but so well at Savannah, when, as a matter of fact, the cars were entirely different, although from the same factory. The controlling body, the American Automobile Association, should divide cars into two classes for racing purposes, perhaps three classes: big cars, small cars, and stock cars. At least 10 months before the opening of the racing season, the permissible cylinder sizes for each class should be announced, and all road races should be competed in only with cars complying with these dimensions. A small car race, whether in California or Massachusetts, should be under the same rules, and with equal enforcement of such rules, so that the motorist, whether in Kentucky or Maine, has by the merest intelligence of the result a complete knowledge of the race—knowing as he does the permissible motor sizes and other governing conditions. So should it be with stock chassis events and big car races.

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IT does not pay the maker to enter contests unless they are so conducted. The present-day car maker disposes of his cars in every state of the Union, or, at least, hopes to, and if he competes in a contest in Maryland, it is due him to have such governing rules that a reader in California will not have to spend weeks discovering the exact details of the many cars, and later trying to discover which car really made the best showing.

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THE winning car is the only one to make the best showing, barring unusual tire troubles, and racing rules should be such as to make this possible. A medley of different-powered cars is not needed in the same race. If one car has 50 per cent more cylinder volume than another, it should not be in the same race. This difference of power or cylinder volume can be avoided by announcing sizes, such as Great Britain did in its 4-inch race this year, and making it imperative on every maker building specially to meet the demands. With a race among equal-powered machines there is an opportunity for comparisons in the result columns, which comparisons are absolutely impossible with different-powered cars. A fine example of this was had in this same Isle of Man contest, referred to above, which was promoted by the Royal Automobile Club of Great Britain.

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WHAT is true of road racing is true of hill-climbs. The classifications for a Cleveland hill-climb should be the same as for one in Kansas City or Cincinnati. Instead, one city classifies according to price because one dealer with a medium-priced car thinks that he can put it over his higher-priced rival; in another city a classification by horsepower is used, the horsepower taken being that given in the maker's catalog; in another city it is horsepower classification, but determined by formula; and in still another, classification is by piston area. What is the result? One car wins class A in one place, class B in another and C in another, but who 500 miles away knows the real facts? There should only be one classification, and it should be used in every hill-climb, and no deviations from it should be allowed by the governing body.

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STILL further, with every hill-climb report should be the length of grade, the per cent of rise, and road surface. Given a few details of this nature, and the results are perfectly intelligent to motorists in any part of the country.

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BUT you cannot stop with hill-climbs; reliability runs should exhibit the same uniformity. There should be classes of reliability contests, not more than three at the most. Designate one class A, another class B, and a third class C. The distance of the test and the rigidity of the rules should determine the classification. The class A test should be conducted absolutely the same whether in Denver or Boston. It should not be permissible to cut out a final examination in one city, or eliminate the brake test in another. Have uniformity in all and the maker will always know where he is at, and the reader will appreciate.

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WHAT holds good in hill-climbs, road races and reliability trials, is equally applicable to economy and tire tests. One set of classifications must rule in all, one method of determining gasoline and oil economy, and one scale of penalizations for all like contests. These are Utopian conceptions, yet easy of attainment. The making of rules must be taken up months before the opening of the season, and not after some contests have taken place. Before a code of rules can be decided upon, the interested makers should meet in a convention and give their several views on the situation. A good time for such a convention is during a show. At such a convention it would be impossible to decide on a full text of rules, but the main features, such as classification, could be determined. This in the end is the big point of dispute in all contests, and when it is properly settled 50 per cent of the task is done. This is the part that vitally concerns the maker and decides his realm of contest operation for the season. All the rest of the rules can be compiled by a committee of three conversant with the work.

FRENCH MAKERS COMBINE AGAINST RACING

Desperate Steps Taken To Kill Grand Prix—Forty Cars Are Necessary by December 31

PARIS, Dec. 18.—Engagements are open for the French grand prix, to be run on the Anjou course in Chateauland July 2, 3 or 4. For $1,000 a single car not exceeding 130 millimeters bore can be entered; for two racers the price is $1,800, while for a full team of three the sum of $2,400 must be paid over to the sporting commission of the Automobile Club of France. But if motor car makers want to race over the smooth roads in the neighborhood of Angers they must pay down their cash with unusual promptitude, for the racing board has taken the decision to abandon the grand prix unless forty entries are received at 6 p. m. on Thursday, December 31. In other words, the sporting commission of the Automobile Club of France has decided to kill its own race. Lacking sufficient courage to put it out of existence with an honest blow, it has imposed such conditions that there is nothing to be done but accept the grand prix as dead and awaiting a formal interment.

Seventeen Against Racing

Seventeen European firms, comprising Benz, Brasier, Bayard-Clement, Dietrich, Germain, Mercedes, Motobloc, Panhard, Renault, Berliet, Leon Bollee, Darracq, Delaunay-Belleville, Isotta-Fraschini, Minerva, Peugeot and Pipe, have signed an agreement not to take any part in any race in 1909, and further, to do everything in their power to prevent outsiders using their cars for racing purposes. Breakage of the engagement will incur a penalty of $20,000. The first eight of the firms on this list took part in last year's grand prix and always have been strong upholders of racing. Of the remainder none but Darracq and Isotta-Fraschini have taken part in speed tests, and whether there had been an agreement or not would not have figured on the 1909 lists.

The result of this agreement is that the possible number of starters in the next grand prix is reduced by twenty-four. In 1906 there were thirty-two cars in the prix; in 1907 the number was thirty-seven; this year there were forty-eight starters at Dieppe. Deduct twenty-four from the highest of these figures and we are still far from the forty which the club must have before it will consent to hold its annual race.

Other Races Made Money

Officially the reason for this minimum is that the race cannot be made to pay with a smaller number of cars. One does not need to be a mathematician, however, to figure out that since the 1908 grand prix realized a profit of more than $20,000 with forty-eight starters, and that the 1907 race gave a credit balance of about $10,000 with only thirty-seven cars, it is possible to hold the race with even thirty cars or fewer and still have a balance on the right side of the ledger.

Another reason for putting this ban on racing is that long distance speed contests are too costly for the manufacturer. No one denies the truth of the statement, but with the profits already in hand and obtained each year the objection could easily be removed if there was any desire to do so.

Cold Feet Apparent

The truth of the matter is that the big French manufacturers have got cold feet. Dieppe disheartened them; Bologne discouraged them still further; Savannah had no influence whatever, for there was not a manufacturer in France or an engineer acquainted with the cars who had the least hope of seeing a French machine carry off the trophy. But for outside pressure and liberal help from the tire firms not a single French car would have been sent across the Atlantic. At the offices of the sporting commission a race was on the program and should be held in July, 1909. At the factories represented on the commission the decision had long been reached that there should be no more speed tests in France. As all the members of the racing board, with the exception of two, have important factory interests, and are indeed the men who have been behind the racing cars, it was not a very difficult matter to put a stop to racing. To abruptly withdraw would have been undignified; strangulation by impossible conditions was therefore decided upon.

Some Entries Already In

For the present entries are open, and indeed already have been received by the secretary of the racing board, the firm being Cottin-Desgouttes, of Lyons, and the cars four-cylinder models of 130 millimeters bore and 200 millimeters stroke. A small group within the club and a still larger group without have hopes that the forty cars may be found in the 21 days allowed, thus forcing the club to organize the race it has promised but has done its best to kill.

PRIZE IN SAVANNAH LIGHT CAR RACE

Of those taking part in last year's race Mors, Itala, Fiat and Opel have refused to sign the anti-racing agreement, and might all be induced to take part in the 1909 event. Add to these three cars from America, six from England, six from the smaller Italian firms which took part in the 130 millimeter Italian race of this year, nine from the smaller French firms not previously taking part in big races, and the figures would be so near the limit that somebody would be induced to complete the number. It is indeed declared that should the entries be only two or three short of the necessary number de Dion would come forth and fill the breach. The Marquis de Dion has been one of the stoutest opponents of racing, but is now of the opinion that in view of the engagements taken and the promises made the club cannot abandon its grand prix without losing all prestige.

Anjou in Despair

It can easily be understood that the Anjou district is not at all delighted at the turn events have taken. The local committee has been hard at work for 3 months drawing up plans, securing sites for grandstands, collecting subscriptions towards the $20,000 subvention, and generally aiding in the preparations for the race. It is so convinced that it should be carried through that should the club abandon the event with thirty entries assured the district would take it up on its own responsibility. It would be somewhat humorous if at the last moment the firms having signed against racing were obliged to scramble in to save them being left out in the cold.

Small Makers Aroused

The voiturette race has been subordinated to the grand prix; if at the end of the year the entries have been obtained for the big race the lists will be thrown open for the one-lungers. The makers are generally ill-pleased at the way they are treated, and the Sizaire-Naudin company has declared that if the grand prix is abandoned it will build racing cars all the same, putting them in any race that may be organized, or at the worst giving a speed demonstration alone on some fast course. This declaration on the part of such an important concern has encouraged the supporters of road racing to believe that the movement may become so general that the club may be forced after all to give in and carry out its original card.

FACTS ABOUT ITALY FOR MOTOR TOURISTS

SAMPLE STRETCH OF ROAD IN ITALY USED FOR MOTOR TRAVEL

ITALY for the motorist is not France, not by a good deal. Its roads are not French roads, and its hotels are not French hotels—more's the pity! And you pay two prices for everything that matters to the motorist. Gasoline comes in the American 5-gallon can of commerce that you find in China, Dahomey—and Italy, and here you pay for 5 gallons a price often double what you pay for a more volatile spirit in France. Oil—any old kind—costs a franc and a half a kilo, which is dear or not, according as to where you have done most of your motoring in the past, but as it does not give as good results, nor go so far as that you get in France, so oil, too, works out as high-priced as gasoline, the motorist finds.

Roads Bad in Italy

All these variations on the motorist's ordinary procedure are not so serious to take away entirely from the enjoyment of motor touring in Italy. The worst is the fact that a larger extent of bad road will be encountered in a week's touring in Italy than will be met in a month in France.

Italy's hotels, taken by and large, are neither so good nor so reasonable in price as those in France, and you invariably pay for garaging your machine 2 or 3 francs a night—which you are seldom obliged to do in France—and often you will be forced to stable your mechanical horses outside the hotel, and in an inferior and incommodious shelter.

Some Italian Itineraries

Not every tourist in Italy covers the entire country in his wanderings. Naples, Rome, Florence, Padua and Venice; or Florence, Bologna, Milan, Como and then Switzerland are the usual itineraries followed, and because of their directness there is one road through Æmelia 32 kilometres in length and perfectly straight and flat and conventionally much that is really Italian is missed, and much that is the same thing that one gets elsewhere in Europe is included. In the articles which make up the usual series of Italian itineraries are four chief routes, which may be combined or taken separately, according as to where one makes his respective exit and entrance. They have been connated very carefully, and barring the changes which may be expected to arise from the change of seasons, or such as are brought about by even brief intervals of time, they may be depended upon to lead out of many pitfalls that might otherwise cause annoyance and delay. They cover the best of Italy, on and off the beaten track; the roads are of the best—and the worst; there is the seashore, the mountain, and the plain.

If one would push on further and descend into Calabria, he must be prepared to take chances—not necessarily with brigands, though perhaps he may have some experience of them, too—with very, very many of the conventional discomforts of travel. One must literally be as tough as hickory, as patient as an owl, and with the stomach of an ostrich if he is to come back safe and sound and wholly satisfied with his round from, say Naples to Reggio in Calabria and back again, or to Otranto and Brindisi. The thing is worth doing, however, by any one with sporting proclivities, though the road is easier to follow than to ride over.

The following hints as to ways about will be useful: For maps, get the French-made "Carte Taride d'Italie." It is in three sheets, covering all of Italy, including Sicily, and is printed in three colors. It is very easy to read, plainly marked and cheap, costing only a franc a sheet. It does not distinguish the good roads from the bad as well as it might be made to, and many of the minor crossroads are omitted altogether, but in general it is a very satisfactory map and the most legible of any made covering Italy.

Road Maps Are Excellent

For absolute accuracy there are no road maps of Italy as good as those issued by the Touring Club Italiano. They are presented gratis to members of that excellent organization, and sold at a low price to outsiders. The objection is that it takes fifty-eight sheets to cover Italy. The hills

DITCH ACROSS ROAD OR CULVERT

RAILROAD CROSSING

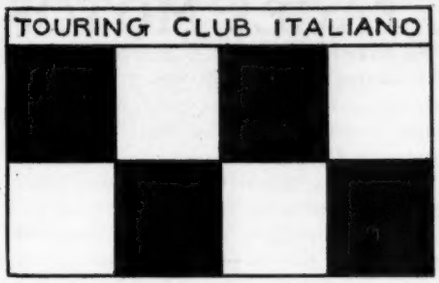
between 4 per cent and 7 per cent, and those above 7 per cent are marked plainly, the altitudes are given throughout, and the great lines of communication by road are marked as to the quality of their surfaces.

Another similar series of Italian road maps is the "Carta d'Italia Sistema Becherel Marsieni," scale 1 1/250,000, in thirty-five sheets, printed in colors, with a system of roads classification, and selling at a franc a sheet. It is similar to the Italian Touring Club map and is everywhere obtainable. For this reason it will perhaps best serve the visiting motorist who has not provided himself with maps beforehand.

Guide Books of Italy

Guide books in Italy are as follows: The most useful of all is the "Annuario di Touring Club Italiano," with plans showing exits and entrances to all the chief cities and towns, the location of the principal hotels, garages, etc., besides a mass of useful contributory information. Next in importance, and of inestimable value, are the three volumes published by the Italian Touring Club, entitled "Strade di Grande Communicazione," with detailed itineraries, and illustrative profiles of the elevations along the road, showing all rises and falls in an unmistakable manner, so that he who runs may read thereof. Baedeker's or Murray's guide books have little or no information of value to motorists, though some of the large scale maps of certain regions in the former may be found useful in making excursions from a center. In this class are the maps of the Italian lakes and the environs of Naples, Rome, Florence, etc.

Slow Down



One of the Road Signs

For hotel lists there is nothing to be compared with the "Annuario" of the Italian Touring Club, but those given in the "Annuaire pour les Pays Etranger" of the Touring Club de France and of the Automobile Club de France are good as far as they go. Joanne's "Italie" in French lists Italian hotels having garage accommodations, and in this respect is ahead of any regular guide book published in English. Some of its large scale maps, too, are good. Indeed, it is a very useful book for the traveler by road in Italy.

The road signs of Italy are not what they are in France. They are neither so frequent, so conveniently placed, nor so well kept. They are often found wanting at some particularly puzzling crossroads. The privately-placed road signs, those found here and there throughout Italy, erected by the touring club, are all sufficient and very readable, and in certain sections, as in Venetia, the local clubs have rendered similar services. So far as they go the privately-erected road signs of Italy are distinctly good, but the government itself has been remiss.

There is nothing in the way of sign-posted information which gives the percentage of the rise on a hill, however, as in France, and the information to be acquired from local sources is often unreliable.

From Florence to Bologna, via La Futa pass, is an easy enough hill-climb, if you don't stray from the main road; if you do you may strike a bit of 17 per cent hill, or another of 25 per cent, for a kilometer or more, as the writer did. And at Florence, in the garages even, they will not tell you that there is an easier route via the aptly-named Montepiano, or via Pistoja and La Poretta. Either of these is a much better road than the main route over La Futa, which in spots rises and falls from 8 to 10 per cent for a considerable distance, and the itinerary is hilly throughout. The distance by the direct road is in the neighborhood of 100 kilometres, and by La Poretta perhaps 25 more.

Dangerous Turn

Road building in Italy has not reached the height that it has in France. This seems mainly to be because of a lack of unity of purpose.

A Contrast—One of the Well-Kept, Smooth Roads Found in France

BUICK OFFICIAL FACES MOTOR TARIFF PROBE

WASHINGTON, D. C., Dec. 21.—The ways and means committee gave W. C. Durant, of the Buick Motor Co., a half hour Saturday in which to present his views on the tariff question. He started off by saying: "The Buick Motor Co. is opposed to an increase in the tariff on motor cars, is opposed to the retention of the present tariff, and is advocating a reduction to 20 per cent, advocating a separate classification, with a duty of 20 per cent, with 50 per cent duty on motor car parts. Mr. Carton, our attorney, appeared before the committee some days ago at my request, because it was impossible for me to present the case, having important business in another direction. I wish to correct some of the statements made by Mr. Carton, fearing that the committee may be laboring under a misapprehension. I stated to Mr. Carton that I was not satisfied that the brief filed by the chairman of the licensed association was giving the committee the information which would enable it to frame a proper bill governing the motor car industry.

Buick's Canadian Interests

"The Buick Motor Co. has been accused of being interested in the reduction of the tariff by reason of owning a factory in Canada. I wish to say that the Buick Motor Co. does not own or control a factory in Canada, but has a very slight interest in an institution in Canada. That concern last year employed a capital of $65,000. It produced 197 cars. The amount of its investment in machinery was $12,000, according to its last inventory, with $8,000 worth of that machinery on hand, not in use, representing a total investment in active machinery of $4,000. The company occupied a plant for which it pays $2,500 a year rent, which includes the power, the light and the heat —hardly as much as we would pay for a retail store in the city of Washington. It has been represented that the fact that we are interested in a small way in that Canadian plant is operating against the statements which we are now making, and which we hope might enable the committee to give us a reasonably fair bill."

Representative Crumpacker asked: "Tell us why you need the reduction. What good will it do you, or the American manufacturers, if you have a reduction in the duty? How are you handicapped now?"

Mr. Durant's Statement

Mr. Durant continued: "The Buick Motor Co. is attempting to establish a permanent business. It already has an investment in plant and equipment of $1,450,000. It produced last year 8,796 machines. It contemplates producing the coming year 18,000 machines. It has employed in its plant, equipment and with its capital, about $3,500,000. It did not engage in the motor car business with any idea of continuing temporarily for immediate profit, but it expects to remain in the business indefinitely, and the Buick Motor Co. believes that it would be unwise to encourage a tariff so high that at some future time, when the composition of this committee is quite different, that we might be able to present our case as well, and be obliged to submit to a wholesale reduction of the tariff, to our very great detriment."

"In other words," said Representative Underwood, "you do not want to build your manufacturing interests on an artificial basis?"

Able to Meet Competition

"No, sir," replied Mr. Durant. "Again, we are attempting to build up a trade in foreign countries, and from the investigation which we have made we believe such a thing is possible. We are able to meet competition from foreign manufacturers not as well as you were led to believe by Mr. Carton, who did not understand the facts, but because we are attempting to build cars suited to the needs of the foreign trade. The foreign markets have been used by the manufacturers of motor cars in past years, as a dumping ground, and the American product, I am sorry to say, does not stand high.

"Referring to the brief submitted by Henry B. Joy, the general manager of the Packard Motor Car Co., which is very complete, I take exception to his presentation, as a manufacturer of motor cars, for the reason that it does not correctly state the facts. When the matter of a hearing before this committee was first taken up, as a member of the licensed association committee, I received a circular to the effect that 60 per cent duty was necessary, and that a very careful scrutiny to prevent the undervaluation in the customs was necessary. That circular, if I remember correctly, was dated November 18. On November 28, I received at St. Louis a telegram asking me if Mr. Joy could represent me at a hearing before this committee, and asking me to urgently urge the retention of the present 45 per cent duty. To Mr. Joy had been delegated the work of preparing all of the facts and figures necessary for the committee. I felt that if the first circular asked us to support a 60 per cent duty that a 45 per cent duty could not be right, and I took the time to investigate, and following the brief submitted, discovered that the whole plan is to protect, not the American workman, but to protect, in a great measure, extravagant management and enormous profits. The American laborer is asked to be protected; and I am asking you to analyze the cost of a motor car, if you care to do so, and find out how much direct labor there is in that motor car that should be protected.

"The direct labor in the manufacture of a motor car selling at from $1,250 to $1,500 is about 14 per cent. In other words, if a machine costs $700, about $100 of it is direct labor. It has been presented that it was necessary to protect that $100 of direct labor by a 60 per cent duty upon the price of the finished machine. I think it is unreasonable and unfair."

Chairman Payne then said: "Now, you do not mean to have this committee believe that the cost of the labor in making one of these $3,000 or $4,000 machines, where the raw material itself is not worth more than $300 or $400, is only $100?"

"I stated," replied Mr. Durant, "that the cost of a machine listed at from $1,250 to $1,500, is approximately $700, that $100 of it will represent the direct labor in the cost of the machine."

Chairman Paine's Opinion

Chairman Payne said he was satisfied that 20 per cent would be a protective duty on motor cars. The only question was whether the committee should make it more for the sake of revenue, and whether motor cars were not better things to get revenue out of than almost anything on the list.

The following testimony was then adduced:

The Chairman: You advocate a duty of 20 per cent on the completed motor car and 50 per cent on all or certain parts?

Mr. Durant: Yes, sir; imported.

Mr. Underwood: You say, in your judgment as a manufacturer, 20 per cent on the completed motor car would fully protect all American labor, and provide a reasonable profit?

Mr. Durant: I think it would; and another thing, in making the comparison, the Packard Motor Car Co. has been used in that brief presented by Mr. Joy, as against the Berliet and Fiat. I do not know that we are prepared to accept the Packard standard as the correct standard. Had it been presented by somebody else who had a different idea of values and costs and profits, they might have made the comparison with a $10,000 car, which might have required 150 or 200 per cent. As I understand it, no effort was made to inquire into the cost of machines which they were comparing, neither was there any effort made to inquire into the schedule of wages in foreign countries, as against the schedule of wages paid to the American workmen. In a general way, eight concerns have been quoted as against thirty-four concerns in European countries, employing, in the aggregate, about the same number of men; but I find, upon analysis, that the eight American concerns, employing 11,400 men, means an average of 1,425 men employed, whereas in all Europe—and they have not given the names of the institutions—10,347 men are employed in the aggregate, an average of about 300 men per factory, and we know, as manufacturers, that small institutions employing 300 men cannot compete with concerns employing 1,500, 2,000 or 2,500 men. For that reason I do not think that you are getting the information that will enable you to properly frame this bill.

The Chairman: We do not seem to be getting much information from you.

Underwood Asks a Question

Representative Underwood wanted to know if it was an expensive business shipping cars, either for us to ship abroad or for their competition to come in here. In other words, he wanted to know if the freight rates were high. Mr. Durant replied they were rather high; it was figured

at about 5 per cent. "Then that adds 5 per cent to the duty," replied Representative Underwood. "The better way to get at it is that there is a much greater demand than supply," said Chairman Payne. "The factories can not meet the demand. The supply is much smaller than the demand."

This interesting colloquy then ensued:

Mr. Boutell: You have stated here that you contemplated building a factory in Europe; was that erroneous?

Mr. Durant: It is the intention of the Buick Motor Co. to obtain a foreign trade.

Mr. Boutell: I asked if it was the intention of the Buick Motor Co, or parties interested in it to build a motor car factory in Europe?

Mr. Durant: At this moment I could not answer that question yes or no.

Mr. Boutell: There is no use fencing with the committee. If you do not want to state, you need not, but it was stated here by your attorney that it was contemplating building a factory in Europe. That may explain what would otherwise be unintelligible, why you wanted a reduction in the duty, and I simply asked you, as the general manager, whether that was true. With the reduction in the duty, and the difference between the ocean rates and the railroad rates, it would be apparent that there was a very good business reason for your advocating a lower duty.

Mr. Durant: It would not be likely that we would want to destroy our own home trade by reducing the tariff to permit of our manufacturing abroad where we have no special interest.

Mr. Randell: But that is not answering the question, whether you expect to begin manufacturing abroad or not.

Mr. Durant: No, sir.

Mr. Randell: Why did you not answer the question?

Chairman Payne then stated the committee had heard Mr. Durant for half an hour, and during the last 5 minutes had not been able to get any facts out of him. "He approves the statement of Mr. Joy, so far as the facts are concerned. He is excused," said Mr. Payne.

BOOM THE NEW YEAR'S RUN

Philadelphia, Dec. 21—So many Wilkes-Barreans have signified their intention of joining the escort which will meet the contestants in the Quaker City Motor Club's New Year endurance run to their town that the contest committee of the club has hung up a $300 cup open only to Wilkes-Barre motorists, to be run under the same rules as the big contest. The Wilkes-Barre contingent will start from home on the morning of December 31, and will finish their run while the Quakers are doing the first leg of theirs, and will follow the same route both days. There are now twenty-one entries to the main event, and with over a week before entries close the start should see fully thirty cars in line, which with the Wilkes-Barre quota, on their second day's run, should show a total of fully two-score cars pulling out of Philly on New Year's morning for the 154-mile run over the mountains to Wilkes-Barre. Chairman Charles J. Swain, of the technical committee, has prepared an original list of penalizations which will make clean scores as scarce as the proverbial molars of the female domestic fowl. There will be no run-overs if the technical committee can help it, and as all the contestants have been fore-warned and will be allowed credit for defects of which they give notice before the start.

PALACE SHOW BIG ONE

Seventy-seven Different Makes of Cars Will Be on Exhibition—The Color Scheme

New York, Dec. 21—A week from next Thursday the Grand Central palace's show will open in a blaze of glory and the big building soon will be in the hands of the decorators who are rushing through the elaborate color scheme adopted by the American Motor Car Manufacturers' Association. No one attempts to gainsay the fact that it will be a gigantic show, for by actual count there are to be no fewer than seventy-seven manufacturers of complete motor cars exhibiting as well as 230 makers of accessories. In the former class are included sixty-six distinct types of pleasure cars and eleven makes of commercial vehicles, the latter ranging from a low-powered delivery wagon costing $500 up to 3 and 10-ton trucks costing from $3,000 to $6,500 each. In addition there will be shown in the importers' section the latest 1909 models direct from the Paris salon.

It is stated that $30,000 has been expended in the decorations and lighting effects for the show. This vast sum of money together with 8 months of labor on the part of an army of workmen, will produce what is expected to be the climax in decorations for an industrial exhibition which lasts but 7 days. The money for art and the expenses of the 307 exhibitors who will offer their latest production in motor cars and accessories, will have served its purpose, however, for the maker, designer and buyer each will have seen his favorite car exhibited under conditions that he deems only proper for such a wonderful piece of mechanism as the modern motor-propelled vehicle.

The palace at Forty-third street and Lexington avenue, both inside and out, will be completely transformed by the decorators in their effort to supply a proper stage for showing motor cars. The decorative scheme is of the early English period with the red roofs, while the entire affair will be illuminated with some 8,000 or 9,000 electric lights supplying a brilliancy that is expected to surpass any previous exhibition in this country. Although it required 6 months to prepare the decorations which is the result of the best work of artists, modellers, carpenters, drapers, carpet layers, plaster workers, scene painters, sign painters, electricians, sculptors and workers in fancy iron and brass, the whole has to be installed in about 5 days and nights and removed in less than 48 hours when the show comes to an end on January 7. Those who have seen the plans admit that the scheme offered at the palace will surprise even the most optimistic admirer of such affairs. The electric lighting, flashlights, statues, paintings, electrically lighted flowers and gardens, illuminated signs, silk banners, glass mirrors, flags and bunting artistically arranged, the whole setting off the best in American and foreign cars will all combine to make an exhibition that will be well worth visiting aside from the motor cars as an attraction.

So great has been the demand for space that there will be several private exhibitions held by makers who have been unable to get into the palace with their cars and accessories. Some are to show in hotels.

NEW TREASURY RULING

Washington, D. C., Dec. 22.—Regulations issued November 27, 1907, by the treasury department providing for the allowance of a drawback on motor cars manufactured with the use of imported parts and materials have been extended to cover the exportation of cars manufactured by the members of the Association of Licensed Automobile Manufacturers with the use of imported parts in accordance with its sworn statement of September 23, 1908, filed with the collector of customs at New York, together with a list of members of the association. The regulations expressly provide that no drawback is to be allowed under them on horns, lamps, odometers and other attachments which may be readily detached from the car and which do not form a permanent part thereof.

BATTLE OF LITTLE CARS

Hartford, Conn., Dec. 19—Local interest runs high in the challenge issued by the Maxwell representatives for a winter endurance run from Hartford to Pittsfield and return, a distance of about 150 miles. For a few days after the issuance of the Maxwell edict, none seemed to regard it at all seriously. Finally the Mitchell agent couldn't stand it any longer and accepted the challenge of the Maxwell. Then the Buick representative expressed a desire to participate. But, to make the proposed event an interesting occasion, the Buick agent stipulates that each entrant must post $500 as an entrance fee, the winner of the contest to take a good share of the money. It is quite likely the event will be pulled off shortly.

DETROIT ALLOTS SPACE

Detroit, Mich., Dec. 19—The Detroit Automobile Dealers' Association held its drawings for space at the annual show tonight at the Tuller, the members of the association drawing first, after which the local trade not represented by membership in the association, gobbled up what space remained. There were thirty-seven spaces allotted, the total comprising 30,000 square feet of floor. In spite of the fact that the Detroit show has not yet been placed on the sanctioned list of the Motor and Accessory Manufacturers' Association, a considerable number of the accessory manufacturers and dealers were represented in the drawings and applications for space.

LONG AND SHORT STROKE MOTORS DISCUSSED

EDITOR'S NOTE—This opening shot on the long-stroke motor by E. A. Meyers of the Model Automobile Co. is in favor of long strokes. Motor Age invites replies, criticisms and views on the subject of "Long vs. Short Stroke Motors."

WHILE there is so much discussion as to the relative merits of the long and short-stroke motor it is somewhat interesting to make a comparison of the different articles written on the subject and to note the grounds upon which the claim of each is based. In the beginning I will say that my knowledge of gas engine construction has been practical as well as theoretical. During the 15 years I have devoted to the study of this subject I have superintended the construction and testing of over 5,000 engines, of a great variety of sizes and types, covering the single-cylinder engine from a 4-inch bore up to a 17-inch bore and 30-inch stroke, and the four-cylinder from the very smallest to a 16½-inch bore and a 26-inch stroke. Up to 6 years ago my work covered what is known as the short-stroke engine, and since that time it has been divided between the short and the long-stroke motor, most of the time having been devoted to the latter.

I do not claim to know it all by any means. Others perhaps have found out things in motor construction which I have been unable to learn. On the other hand, I believe that I will not be charged with egotism when I say that I have at least had an opportunity to find out some things denied to the designer who has had experience with the short-stroke or small motor only. In my experience I have found out things which have been of material advantage to me in the construction of larger engines, as a result of my work with the smaller high-speed motors. On the other hand, I have secured much valuable information about small motor construction in my work and experience with large engines which otherwise I might never have been able to detect.

Question of Bore and Stroke

When the A. L. A. M. adopted the plan on which the horsepower rating was based, it is quite evident that but little thought was given to the question of accuracy of horsepower. At any rate just now it is somewhat difficult to get anyone to admit that he really believed at any time that the stroke had nothing to do with the horsepower of a motor. On the other hand, it has been but a few years since any attorney, involved in the trial of a case, wherein the horsepower of an engine was in question, had but little difficulty in getting gas engine experts to testify under oath that the stroke had nothing to do with the horsepower of the engine and that a motor with the bore equal to the stroke would produce just as much horsepower as another motor with the same bore and with 1, 2 or more inches longer stroke.

I take it for granted that the recent trend of motor car manufacturers toward longer-stroke motors, and the comparative tests of the past year have put to rest for all time the contention that a motor with the stroke equal to the bore would produce as much actual horsepower as one of the same bore with the longer stroke, and that we need not spend time on this particular point.

With this point settled the remaining questions are: First, to what extent does it increase the horsepower? and, second, is the longer-stroke motor more desirable for motor car construction and service?

Differs With Baillie

In an article written by G. H. Baillie, he refers to a formulæ wherein the claim is made that by increasing the stroke 50 per cent, the horsepower is increased 17 per cent. Nothing could be more misleading than a statement of this kind without a detailed explanation on which the claim is based. It appears that parties making this statement have lost sight of the fact that speed must be taken into consideration and that it is utterly impossible to give any formulæ by which the increased horsepower can be shown by increasing the stroke, unless a given speed is taken on which to base the rating. For illustration: Take a 6 by 6 four-cylinder motor and make a test of it, as compared with a 6 by 9. At first thought I would figure that the 6 by 9 would develop just 50 per cent more power than the 6 by 6, whereas at one speed it will develop over 50 per cent more power than the 6 by 6, and at another speed it will develop less than 50 per cent. Piston speed must be taken into consideration in figuring the actual horsepower delivered.

Other designers may take issue with me at once when I make a statement that a 6 by 9 motor will develop over 50 per cent more power than a 6 by 6, both running at a speed of 400 revolutions per minute, but that such is the case can easily be demonstrated. On the other hand, the 6 by 9 will by no means develop 50 per cent more power than the 6 by 6 when running at a speed of 800 revolutions per minute. The question then comes up, how are we going to rate the motor for motor car construction and where are we going to draw the line and what formulæ can be presented upon which the accurate horsepower rating can be based, covering engines of all classes and of different construction? I am free to confess I know of none that can be proposed that will cover the situation with accuracy. If we had a fixed speed from which to figure then the matter would be simple, but considering the fact that these motors must be run from a minimum to the maximum speed of which they are capable, it is impossible to increase the stroke to the greatest point of efficiency for one speed and secure the same results at all speeds.

Desirability of Long Stroke

I state most emphatically that better results can be secured from a motor with the stroke in excess of the bore for general motor car construction, but also wish to state just as clearly that it cannot be increased advantageously to the same extent that it can be where the motor is to be used for some other purpose where less flexibility is required and where it is to be operated at something near a given speed. In making this claim it is based on the following facts:

First—Where we increase the power of a motor by adding to the stroke, the power gained thereby is procured without any approximate increase in the weight of the motor, and it will not be denied that every move that can be made to increase the power without increase of weight is a step toward high-grade motor car construction.

Second—In expanding the gases farther the exhaust is discharged under less pressure, lessening the noise of the exhaust and decreasing the amount of heat carried off through the exhaust, as well as the liability of back pressure.

Third—The greatest efficiency and economy is obtained when the piston is running at a reasonably high speed. As most cars are now built, the speed limit is from 40 to 60 miles per hour for ordinary use. These same cars probably run 80 per cent of the time at a speed of 20 to 40 miles per hour. Therefore, it would seem that for general use the car is used at an extremely low piston speed, which, as every engineer knows, means loss of power and efficiency. Hence, by increasing the stroke a higher piston speed will be secured for general use of the car.

Power Needed on Hills

Fourth—The full power of a motor is most needed for hill-climbing when the motor is running at slow speed, and right here is where the long stroke shows its advantages over the short stroke. Do not forget the fact that an internal combustion engine is a heat engine pure and simple; in fact, all engines are heat engines, differing only in the method and the economy of utilizing the heat. In the case of steam engines the coal is reduced by heat to a gas, burned and a portion of the heat generated is absorbed by water in a boiler, converted into steam and expanded in the engine cylinder, giving up a portion of the heat in the form of work, or pressure on the piston, producing power. The balance escapes in the exhaust. In the case of a hydrocarbon engine, the gasoline is mixed

with a definite quantity of air as it is conveyed to the cylinder, this mixture is then burned in the cylinder, producing heat, consequent expansion, pressure on the piston and power, hence the term internal combustion engine as applied generally to gas engines. The gases so formed contain a given number of heat units to the cylinder. The greater part of this heat is utilized, converted into energy from which the greatest amount of power can be gotten. There cannot be conversion of energy of any kind without some loss of heat, and it is a well designed motor wherein the total number of heat units lost does not exceed 65 per cent. The greater part of this loss is carried off through the cylinder walls and the balance through the exhaust. Therefore, it must be understood that the good designer must strive to convert as much of this heat into work as possible. It will thus be seen that the slower the movement of the piston, the greater the loss of heat through the cylinder walls and the less the power from a given size cylinder and from a given amount of fuel. From this it should be quite clear that all the advantages are with the long-stroke motor, not only from a standpoint of power but from a standpoint of fuel consumption, and that the slower the motor must run the more pronounced are these advantages.

Initial Impulse Less

Fifth—The initial impulse is less in the long-stroke motor than in the short-stroke of the same horsepower because of the smaller area of the piston. In other words, the initial impulse of a 4 by 4 is approximately the same as a 4-inch bore and 5-inch stroke, hence if you build a motor of the same horsepower as the 4 by 5 and make the bore equal to the stroke you must necessarily have a greater pressure on the end of the piston at the time of ignition. This means that for a motor of the same power it is impossible to build one of the short-stroke that will operate as smoothly as one of the long stroke.

Someone may say that if it is a good thing to build the motor 4 by 5 instead of 4 by 4 why not go still further and make it 4 by 6 or 4 by 7. Right here is where the distinction must be made between a motor running at a given speed and one running at all speeds, as is required in motor car construction. I have heretofore tried to show why it is impossible to carry it out as far as can be done with a motor wherein the question of power and economy alone are to be considered. The great range of speed must be taken into consideration, as well as the ratio of gearing and the general construction of the car.

Different on Racing Cars

Were I designing a motor for racing only, the ratio of the stroke to the bore would not be the same as one I would design for a general use car. Again, if I were designing a motor to be run at a constant speed, the ratio of bore to stroke would conform to neither, but would be designed to secure the best results at that speed. Hence, in increasing the stroke of the motor for general car use I do not contend that it can be carried to the extent that all other points of car construction are of secondary consideration to the question of power and economy, but I do claim that the designer who is unable to retain all the flexibility of the very best cars of the latest development, and at the same time use a motor wherein the stroke is one-quarter greater than the bore is not doing justice to at least some parts of the machine he is constructing.

PENNSYLVANIA'S PROPOSED TRANS-STATE HIGHWAY

Philadelphia, Pa., Dec. 14—Although events seem to be so shaping themselves that the agitation for a trans-state highway will be begun in earnest at the coming session of the legislature, those back of the project fear that a difference of opinion as to the best route to be followed may cause a setback of which the opponents of the idea—and there are some such—will not be slow to take advantage.

Governor Stuart favors the rehabilitation of the famous old post road—over the mountains, and with the stiff grades which mark all ancient roads in this country—mainly for the reason that it would furnish a solid foundation ready to hand for the superimposing of the top surface. The governor is of the opinion—and rightly so, in the estimation of many road experts—that the state could save a million or more dollars by following the route via Chambersburg and Bedford, despite the fact that some of the grades are abnormal. The firm foundation for an up-to-date highway is already there, and that it is a good one its present fair condition, after nearly a century's service, bears evidence.

But the claim that the southern route is the shortest is opposed by the advocates of a more northern route, via the Juniata valley—touching Mifflintown, Huntingdon, Tyrone and Altoona. The latter claim that the governor's choice is longer by a few miles than theirs; that theirs is a low, level route, with nothing nearly approaching the grades to be found along the southern road; that the latter is inaccessible and out-of-the-way; that there are no toll companies to buy out—at handsome prices—on the northern route; that the southern route can offer nothing in picturesqueness that cannot be more than equaled by the scenery along the Juniata; and that despite the governor's claim of economy for the southern route, it would be more than offset by the much greater expense entailed owing to the necessity of transporting the material of construction such comparatively greater distances.

Elaborating on these points, the advocates of the Juniata valley route point to the number of big towns, with hotel and repair shop accommodations, to be found by the tourist thereon—Newport, Duncannon, Mifflintown, Lewistown, McVeytown, Mt. Union, Huntingdon, Tyrone, Hollidaysburg and Altoona, to mention a few of them—with the Pennsylvania railroad paralleling it throughout. Obversely, there are not a few stretches along the southern route where railroad towns are 50 miles apart; few towns of any size, indeed, where hotel accommodations and repair shop facilities can be obtained. With no railroad paralleling it there are not a few points where a bad break-down would necessitate the abandonment of a car.

The lovers of beautiful scenery who laud the merits of the southern route in this particular are men with the argument that the blue Juniata, with its Lewistown and Mapleton narrows; the deep gorge along the South Fork river, west of Gallitzin, and numerous other beauty spots along those winding mountain streams offer views which vie in picturesqueness with anything Pennsylvania's mountain section can offer.

The Juniata valleyites certainly have a strong card in the fact that their route is toll-gateless. As soon as the cross-state highway subject was broached the several companies still operating toll gates along the southern route boosted the value of their holdings to the limit.

As to the comparative cost of the two routes, a glance at the map bears out the claim of the Juniata valleyites as to the scarcity of railroad accommodations along the lower route. Material for road construction necessarily must be carried in wagons long distances from the nearest railroad points, whereas the railroad could lay down material at every needed point along the Juniata valley route at minimum cost. There is no scarcity of suitable road-building material, either, along the latter route, while the southern line, it is asserted, is not so well supplied.

Certainly the claim of the Juniata valleyites that their route would accommodate a greater number of people, by reason of the string of large towns along it, cannot be gainsaid.

Motorists here and in Pittsburg fear that if the advocates of the two routes get into a finish fight the whole thing may fall through, especially as there is a strong element, especially among the farming community, which favors the project of connecting the various county seats throughout the state by a network of roads, and which may prove to be the balance of power which will put a quietus on both routes for a time. Come what may, the state is in need of a trans-highway and now is the time to settle permanently which is the better route.

The Readers' Clearing House

EDITOR'S NOTE—In this department Motor Age answers free of charge questions regarding motor problems and invites a discussion of pertinent subjects. Correspondence is solicited from subscribers and others.

GENERATORS FOR CHARGING

Lapeer, Mich.—Editor Motor Age—Through the Readers' Clearing House will Motor Age give its idea as to what would be the better for charging storage batteries, a 110-volt generator or a 15-volt. I desire to purchase one for use in my garage, but do not know which would be the more practical. Personally, I favor a 15-volt 30-ampere machine. What is Motor Age's opinion?—W. E. Goodwin.

You do not state whether you desire to charge sparking batteries or storage batteries for electric carriages. If the latter, you must use a 110-volt generator, which would also do for the sparking batteries. As a garage is likely to have electrics to care for, by installing the 110-volt machine, you would be equipped for both service. You could use the 15-volt machine only for ignition batteries. You can count on 2.5 volts to a cell for regular electric vehicle batteries. When charging starts the amperage is often 25, but after the first 15 minutes' charging it drops to 15 amperes and later to 12. This is for forty-cell batteries. In smaller batteries with twenty-four or thirty-six cells, the amperage will soon drop to 10. In a garage of this nature a good scheme is to use a 90-volt house battery that is floated on the generator line, this battery being suitable for twenty-four cell batteries. The "slop over" from it can be used to charge the small ignition batteries, which take only 6 volts and which it is very expensive to charge from a 110-volt circuit. The house battery can also be used to run the elevator, the lathe and other machines in the garage.

BUICK MOTOR-MISSING

San Antonio, Tex.—Editor Motor Age—Through the Readers' Clearing House will Motor Age tell me what is the matter with my two-cylinder Buick. One cylinder refuses to work now and then. I have tested the plug, looked after the coil on the bench, and have had the car in the repair shop several times, resulting in the installing of a new coil, which is rather expensive. Thinking that possibly there was a short circuit in the wiring, I had the whole wiring torn out, which only remedied matters for a short time, the coil puncturing again. Then a new commutator was put in, thinking that the timing was irregular. But the coils are still puncturing in the same old manner. The points on this coil are always in need of filing.—Subscriber.

Motor Age doubts from your description that the coils are punctured. You do not state by what means this is discovered. The most likely trouble with a coil is a wire loosening from its terminal inside the coil cover. Unless you are in the habit of short circuiting the primary circuit without having the secondary wire up, the puncturing is nearly impossible. The fact of the points becoming pitted or fused frequently would only indicate too strong a battery. Six volts is all that are necessary. The trouble may be that one cylinder may get too much oil, resulting in carbonization and sooting of the plug. This would undoubtedly be in connection with the front cylinder.

THE ISOTTA CYLINDERS

Pittsburg, Pa.—Editor Motor Age—Will Motor Age give the bore and stroke of the cylinders on the Isotta driven by Herbert Lytle in the Vanderbilt cup race last October?—T. L. McGovern.

The cylinder bore of the car mentioned is 5.7 inches, and the stroke 4.7 inches.

MAKING ROLLER BEARINGS

Madison, Wis.—Editor Motor Age—Will Motor Age inform me the correct way to construct a roller bearing for use on rear axles, the roller to be carried in a cage with spacing pins through center of roller. Should the rollers be spaced so as not to touch one another and roll on the center pin, or should they be spaced so as to come in contact with each other? Kindly explain the reason why in either case.—J. K. Severson.

In manufacturing a roller bearing a variety of courses may be followed, but in every case use separators so that the rollers do not contact with adjacent ones, as such action increases friction. Should one become disabled, the work of all the others is interfered with. In Timken roller bearings each roll is in a separate cage; the Hyatt flexible rollers are kept separated and in one or two types each roller has its own axis. For many reasons the cage construction is popular, but the design is largely determined by the ideas of the designer.

SOAP AND SOAP USAGE

Indianapolis, Ind.—Editor Motor Age—The communications in these pages on the uses of soaps for motor cars have been read with particular interest and for the benefit of the many readers of Motor Age I would say that soaps generally used for this purpose are what are commonly designated as linseed oil soaps, and while they are all used practically in the same manner, the quantity of the soap to be used depends largely upon the amount of alkali contained in such preparations. In using a fine oil soft soap of a dark rich amber color, the best results are secured when used in the following manner: One ounce of the oil soap should be dissolved in 1 gallon of lukewarm water. A good method of doing this is to use an ordinary washing sponge and place the oil soap on the sponge, squeezing the sponge out through the water until the soap is thoroughly dissolved and a strong suds is obtained. It is very necessary that the soap be entirely dissolved to get perfect results. When this is done the body of the car should be thoroughly washed with this suds, all grease and dirt being removed as far as possible. Then the car should be well rinsed and washed by using water sprayed from an ordinary hose attachment, at the same time going over the surface wherever necessary with a clean sponge or chamois. The body of the car should then be dried by going over the surface with chamois or other drying cloth. After using such soap, which contains no excess of free alkali, if the body is thoroughly dried, and plenty of friction is used in so doing, the original finish should be restored and preserved without the use of any other body polish. It also might be well to say that it is a good idea to remove any sand or dirt which would have a tendency to scratch the body of the car by spraying it, before applying the soap. These directions can be used to advantage in connection with any of the ordinary brands of soap now on the market, which are used for car-washing purposes.—I. M. P. C.

MAXWELL USES FIVE DRY CELLS

Montezuma, Ga.—Editor Motor Age—Through the Readers' Clearing House, will Motor Age answer the following questions:

1—Why do the Maxwell people use only five dry cells in their ignition system?

2—What should be the voltage of a storage battery to take the place of dry cells?

3—Of what advantage is the side play in the connecting rod from the crankshaft, as seen in some of the Ford models?

4—Was the winner in the Savannah grand prix race an American driving an Italian car or was he an Italian?

I find by letting the air out of tires every 2 weeks and putting in fresh air, reduces the liability of blow-outs to a considerable extent.—Charles S. Felton.

Five dry cells should give 7.5 volts and a freshly charged storage cell will generally give 7 volts. The five dry cells are undoubtedly used because the coils used may consume an extra amount of current and the five dry cells will take care of this. A 6-volt storage cell would be the

proper one to fit to such a car. There always is end play on lower connecting rod bearings, as it gives greater freedom to the piston and does not give rise to any troubles. The winner of the Savannah grand prize race was a French driver piloting an Italian machine. A report was current that Wagner was born in New England, but this proved to be false.

CUSTOMS ENTERING CANADA

Waterloo, Ia.—Editor Motor Age—I am contemplating a tour east next summer, and would like to know, if I should return by the way of Niagara Falls and through Canada to Detroit, if I will have any trouble with customs at Niagara Falls or Detroit?—W. Hillman.

If you become a member of the Automobile Club of Buffalo, the dues to which are only $6 a year, upon the presentation of a membership card you will be able to spend 3 days in Canada without any other formality. Otherwise it will be necessary to conform to the custom requirements. Briefly, you will have to deposit $25 and put up a bond double the estimated duty on the car. The forms in force at the custom house must be used and you should produce a bill of sale, showing the purchase price of the car. The more clearly you present your case, the less trouble you will have.

MANUFACTURES THE COMET CAR

Walnut, Ill.—Editor Motor Age—Will Motor Age kindly state where the Comet motor car is made?—M. A. Stiver.

The Comet car is manufactured by the Hall Auto Repair Co., 640 Van Ness avenue, San Francisco, Cal.

THEY CAUSE DEPRECIATION

South Braintree, Mass.—Editor Motor Age—In order that I may determine the extent of repairs to be made to my double opposed engine, will Motor Age kindly answer the following:

1—When compression leaks past the pistons and rings very badly what does it signify, assuming that rings have not turned?

2—With rings removed from the pistons, should the pistons be a close fit in the cylinders?

3—How can I determine whether or not I will have to have the cylinders rebored in case I have to have new pistons?

4—Will I have to get the piston that was designed for the motor, or will any other piston do that will fit?

5—With both rear wheels jacked up and a pull exerted on the left rear wheel, there isn't any lost motion between wheel and differential; they both act as a unit. But with the right rear wheel when pulled there is quite a lot of play, say about an inch on the circumference of the wheel before the power is applied to the differential. Is this condition right?—New Owner.

Loss of compression, which, in turn, means loss of power, is the first answer. In reply to the second question, No. The piston becomes hotter than the cylinder because the cylinder is artificially cooled and the piston is not. The hotter piston will expand more, and, as a consequence, it will stick, if there is not a difference. "Size" the cylinders. If they are out of round, they should be re-bored. It is best to get pistons such as were designed for the motor, if they proved to be valuable for the purpose. If you find that the design is not good, then it will be time to experiment. The rear axle seems to be in need of overhauling. The condition is not right. It is not much of a job to take it apart and see just what is at the bottom of the trouble.

IDENTITY OF THE SIMPLEX

Lafayette, Ind.—Editor Motor Age—I have a complaint to make and some questions to ask. The questions will help explain the complaint, and I will ask them first.

1—Whose Simplex car is handled by Palmer & Singer, of New York and Chicago, the Sheffield Simplex, of England; the Simplex, of Mishawaka, Ind., or the Simplex, made where?

2—What—that is, make—Simplex car driven by Robertson and Lescault won the second Brighton Beach 24-hour?

3—What Simplex was victor in the Long Island Motor Parkway sweepstakes, Lescault driving?

4—What Simplex—Seymour driving—stood about eleventh in the Thanksgiving day grand prize race at Savannah? Was it the two-cycle car, or what?

5—Was it the $1,000 Buicks—formerly $900—that were driven by Hearne, Easter and Jeffers in the light car race at Savannah?—A Subscriber.

The Simplex product handled by Palmer & Singer is manufactured in New York. It was the Simplex of Palmer & Singer that participated in the second Brighton Beach 24-hour race, which event it won with 1,174 miles to its credit, thus establishing a new American competition record. Again, it was a P & S Simplex stock car in the parkway sweepstakes. It did not win, though, being fourth. The P & S Simplex at Savannah was the same one which proved the winner in the 24-hour race. The Buicks in the race were the small cars with 3¾-inch cylinders, but fitted with magnetos and other equipments. Complete details on these cars were given in Motor Age's race report.

USING CARDAN JOINTS

Marysville, O.—Editor Motor Age—What is the advantage of having universal or cardan joints on each side of the differential; also the arched axle, and dished wheels as on the Peerless? Is it a fact that carbureters having the float chamber set to one side of the spray jet give trouble going around corners and up hills? Are valves-in-head engines, with both valves actuated by one double-acting cam, considered an entire success by the designers?—L. Piper.

If the axle is arched, the spokes of the wheels will be "plumb," presupposing a camber in the road. The Peerless construction is such as to enable the car to negotiate roads in which the usual camber is to be taken into account, also tires are thus enabled to take the load fairly. There are other matters that could be taken into account in this connection, as the workmanship in general of the same axle. Obviously, the universals, in the absence of good practice in other ways, in an axle would be of great avail. If "float chambers" set to one side, as you say, give trouble, it would seem to follow that it is not good practice to do curves at high speed. Your question as it is put is not fair to the scheme of valves to which you refer. There is a certain amount of trouble about or in connection with every mechanical device that man ever turned out. To say, then, that there is to be no trouble with any one scheme, is to be a little far-fetched. The fact that the scheme is in vogue, at the instance of builders of repute, coupled with the fact that its use is continued, is good assurance of commercial success—nay, it is the proof of the pudding, in the absence of proof to the contrary. In point of theory, it is an excellent idea.

REMEDYING FORD VALVE TROUBLE

West Lafayette, Ind.—Editor Motor Age—In reply to C. L. Montroy's inquiry, Motor Age, November 19, page 22, I have found the most satisfactory way is to put on a set of adjustable lock nuts and then it takes but a few minutes to bring all the valves into correct time. Ford owners desiring further information may have such by communicating with me and I will reply.—Dr. W. S. Walters.

COMPARING MOTOR POWER

Harrod, O.—Editor Motor Age—I have been a reader of Motor Age for over 1 year and now ask for some information through its columns. How much more horsepower will be obtained from a four-cylinder motor with a 3⅜-inch bore and 4-inch stroke, 32-inch wheels and a Bosch magneto than from a motor with 3¼-inch bore and 3¼-inch stroke, 30-inch wheels and dry cells?—J. W. Dunlap.

In this case eliminate the diameter of the wheels, the magneto and batteries. A 3⅜ by 4-inch motor will give, according to the A. L. A. M. rating, 18.2-horsepower. The 3¼ by 3¼ will give, by the same formula, 16.9-horsepower. The larger wheels should be taken care of in the gear ratio between the motor and differential. A magneto will slightly increase the power of the motor through the tendency to ignite the gas earlier than would be the case with batteries and coil.

WOODSTOCK'S CLAIM

Woodstock, Ill.—Editor Motor Age: Woodstock, Ill., a town of 5,000, has forty-seven motor car owners, making a record ahead of that of Waukesha, Wis., mentioned in Motor Age a short time ago, I believe.—C. F. Dacy.

SOME CHARACTERISTICS OF DRY CELLS

By J. J. McNerney

IT IS a difficult matter to define the exact status of dry cells as the source of sparks for gas engine work. This comes from the fact that gas engine ignition is a changing and developing art, improvements have been and are being made, and will continue to be effected. In this period of development the dry cell appears to be gaining a stronger position than it has held heretofore through improvements in dry cells themselves, improvements in the spark coils, in spark plugs, and a better understanding of the capabilities and limitations of dry cells on the part of the users.

The dry cell has formidable competitors in ignition service in the magneto generator outfits, in storage batteries, in wet primary cells, and where the engine is stationary in buildings wired for electric current, the electrical energy may be most economically derived from the commercial electric circuits by the use of suitable transformers or rheostatic control devices.

Each source of ignition current has its advantages and disadvantages. No one of them has advantages so overwhelming that we can say unreservedly that one source is the best for general purposes. The best depends altogether upon conditions, such as convenience, availability, reliability, renewability, location of engine, whether it is portable or stationary, amount of capital which can be invested in the ignition outfit, cost of maintenance, etc., etc.

Dry Cells in Ignition Field

It is not proposed to enter here upon a discussion of the relative merits or demerits of the various ignition systems, but rather to point out some of the characteristics of dry batteries for ignition service. Dry cells are coming more and more into extensive use, and the heavy and increasing demand for dry cells for sparking purposes speaks significantly for their usefulness in this field. Their use in ignition service may be classified as follows: as the sole source of energy; as a reserve in case of break-down, or during charging of storage cells, or during repairs; and, as a means for starting.

In purchasing a set of dry cells it is natural that the customer shall ask how long the set will last, or how many miles it will run his motor car. The answer may differ in range all the way from 15 minutes to 2 years, or from 1 mile to 3,000 miles, depending upon the experience of the person questioned. Now it stands to reason that this wide variation is not entirely the fault of the dry cell. If dry cells can be made for 3,000 miles, more can be made just like them, and uniformity of product is what manufacturers have been working toward and what they have been successful in attaining to a reasonable degree in late years.

Much of the misunderstanding as to the service of dry cells would disappear if they were rated, not in time or in miles, but in the number of sparks which they will deliver when given the right kind of a chance,—that is, when connected to a suitable spark coil with a suitable vibrator and a suitable plug. But right here is a difficulty which is opposed to this method of rating. Spark coils, as purchased on the market do vary in a wide degree in efficiency, and several hundred per cent will be necessary to cover the range between the best and the poorest. The characteristics of the timer, the spark plug, the make-and-break apparatus, and especially of the coil itself cannot be divorced from the dry cell when considering dry cells for ignition use.

Driver and Cars Are Factors

But assuming that a dry battery will deliver, when connected to a suitable ignition apparatus, 1,000,000 sparks, each of which is capable of igniting a charge, we still do not have the data upon which the sparks are used whether the two-cylinder or four-cylinder engine, whether the car is run on reduction gear or whether the engine is allowed to run when the vehicle is at a standstill. The personality of the driver and the characteristics of the machine are factors which enter into the equation.

Unfortunately the dry cell is made to shoulder more than its share of the blame, being frequently overburdened through poor adjustment, by improper connection, by poor insulation, and it is not infrequent that the battery is kicked into the junk heap when the kick should have been directed to some auxiliary equipment. To attempt to express the usefulness of a dry cell in terms of a mile a motor car will run is approximately as vague as the question, "How much fun can a man have for a dollar?" As one manufacturer puts it, his batteries will not fill a gasoline tank or prevent the tire from being punctured. It will only furnish sparks and will do this efficiently only when properly treated.

It is obvious that some method is desirable for expressing numerically the capacity of a dry cell. Objections have been raised to expressing it in the number of sparks, and in addition to such objections it must be recognized that there are good and bad sparks. It is claimed that a spark which would ignite a charge a year or more ago will not be suitable in the future, but that as the gasoline becomes heavier a hotter spark will be required for ignition.

Rate Cells by Energy

A logical method of rating dry cells is in the amount of energy they are capable of delivering when operating at a normal rate. We rate motors in horsepower, dynamos in kilowatts, lamps in candlepower, and why not rate dry cells in the amount of electrical energy which they will deliver,—that is, in watt-hours or ampere-hours and volts.

There is surprising uniformity in practice among dry cell manufacturers as to the materials which they use, the quality of the cell depending upon certain details of construction. It does not appear that the battery manufacturers have urged or even advocated a uniform method of rating, but if this piece of apparatus continued to increase in importance and continues to be used in engineering work, the demand is bound to be placed upon manufacturers that they express the capabilities of their product in terms other than "the best on the market," "the highest recuperative power," "everlasting," "always ready," and other superlative terms. The ordinary 6-inch size of dry cell, weighing about 2 pounds, and of a high-grade construction, will deliver from 25 to 35 watt-hours when used at a slow rate of discharge. The output is materially below this when the discharge rate is increased and the capacity of the dry cell should therefore be expressed in watt-hours at a certain specified rate. Returning now to the question which the layman will ask, and continue to ask, "How many miles can be gotten out of a set of dry cells?" A definite reply cannot be made, but he may be informed that users have reported as high as 2,500 to 3,000 miles—an unusually high figure. One thousand miles is a good record for a single set of No. 6 cells on a four-cylinder car. Eight hundred miles is more common, and from that figure down to nothing, according to the conditions previously described, and according to the kind of battery.

Good and Bad Batteries

And there are bad batteries, and probably as many bad batteries as there are good ones. Some makes of dry cells are all bad; other makes are good sometimes; still others are good almost always, and even the batteries of the very best brand occasionally fall down in quality, due to unavoidable accidents and difficulties in the manufacturing operation. Much dissatisfaction may be occasioned by the improper selection of a cell, even although it is of the very best brand in being unsuited to the particular kind of service. A cell intended for door bell, telephone use and "all kinds of open circuit service" is not as good a cell as can be made for heavy ignition. The securing of high

amperage is somewhat antagonistic to long shelf life. Long shelf wear is most important in telephone work, but less so for igniters where the battery does not need to last more than a few months to give its entire charge.

When dry cells are selected for more or less continuous ignition service the highest capacity, higher amperage cells should be employed, while those used only for emergencies should be capable of standing a long time without deterioration, and such cells should be chosen from the lower amperage type.

A common and useful, though infallible guide in the purchase of dry cells for ignition purposes is that when new they shall show a flash test of from 18 to 24 amperes on short circuit. The type of cells for telephone and other similar intermittent service designed to have a minimum depreciation when not in use show a flash test of from 12 to 18 amperes.

Amperage Test Is Useful

The amperage test is useful, not only in showing the initial condition of cells, but the ammeter may also be used for

showing the working condition by occasionally inspecting each cell and noting the current which it delivers. Some users declare that when a cell shows below 10 amperes on this test it should be discarded as being near the end of its life. Others allow the amperage to go much lower, and the writer has observed cells which have dropped to a flash of 2 amperes which are still giving good service, showing that here again it all depends upon the local conditions.

One of the most serious limitations upon dry cells is that there is no available way of gauging the amount of service which still remains in a cell, and there is a great need of some inventions to overcome this deficiency. The operator of a motor car is not so greatly concerned with the fact that the dry cells will run down and need replacement as he is over the fact that they may run down at any unpredeterminable instant, and unless he has a reserve battery he may encounter an embarrassing predicament upon the road.

Some battery manufacturers design their cells so that when they are completely exhausted the zinc has not yet become punctured and the cells, to all external appearances, are as good as new. By some it is considered an advantageous feature to so design the proportions of materials and zinc that the zinc will perforate some time before the end of the useful life, this perforation showing through the paper case and thus giving a visible indication of the approach toward the end of life.

Rejuvenating Dry Cells

The question has been repeatedly asked, "what can be done to a set of batteries which have just quit working in order to get a few more miles out of them—just a few more to take the machine to the nearest life-saving station?" Many answers have been proposed, but none of them is thoroughly satisfactory. The most effective ones are based on the supplying of additional moisture. Numerous suggestions appear in print, showing how, by puncturing the zinc container in numerous places with a nail, and immersing the cell in a jar of water, additional service can be gotten out of it. This is somewhat more sensible than the directions which are given in a recent technical periodical for renewing a run-down dry cell by drilling a hole next to the carbon and pouring in about a spoonful of sulphur dioxide. Inasmuch as sulphur dioxide is a gas and requires an enormous pressure to put it into a liquid condition, it is not perfectly clear how a spoonful of this material may be held long enough to pour it into the cell.

A fallacy which is frequently launched is that dry cells may be recharged by passing current in the reverse direction, the current being obtained from a lighting circuit. While it is possible that a dry cell may be constructed along scientific lines to which this can be done, it is nevertheless true that the ordinary type of dry cell is not "reversible" and the rejuvenation which can be effected in this way is practically negligible.

The kind of service which can be gotten from dry cells depends largely upon the user, upon his first selection of a high-grade product, and secondly upon the way in which he uses them. The number to be connected in series may be four, five or six, depending upon his electrical circuits, and it is generally acknowledged that when the No. 6 size of cell is employed there should be two sets connected in parallel, each set consisting of a suitable number connected in series. The use of the larger size of cells usually designated as No. 7 and No. 8, may in many cases be more economical than the use of the smaller sizes. This again depends upon the rate at which the cells are called upon for service.

Weight of Equipment

Interested as he is in the details of construction of his car it is seldom that the average owner can tell how the weight is distributed. A table prepared recently by the George N. Pierce Co., of Buffalo, gives a close insight into this matter so far as Pierce-Arrow cars are concerned. Among the Pierce equipments are these articles and their weights: Shock absorbers, 28 pounds; odometer and fittings, 2 pounds; foot-rest, 7 pounds; robe rail and brackets, 5 pounds; dash cabinets, 3 pounds; luggage carrier in rear, 17 pounds; tool box in rear under frame, 26 pounds; sprag, 12 pounds; rubber bumpers, 5 pounds; rear axle straps, 2 pounds; gasoline gauge, 1 pound; total, 124 pounds. In addition to this with every Pierce-Arrow is given tools and spare parts amounting to 55 pounds, making the total 179 pounds. Aside from the actual mechanism and body of the car there are extras such as cape top, 138 pounds, and the glass front, 44 pounds that count in the actual weight of the car. Water, oil, gasoline and grease add another 220 pounds, making a total with the accessories of 581 pounds. The ignition outfit of a Pierce-Arrow adds another element of weight. Two separate system are used. The magneto system weighs 32 pounds and the battery system 70 pounds. While the battery system is a convenience, it could under certain circumstances be dispensed with. Aside from the mechanical parts of the car are the lamps, lamp-brackets and horn, weighing 87 pounds, which with the batteries make 157 pounds. This added to the total of 581 pounds for accessories and supplies give a total of 738 pounds of the total weight of the car in running shape.

Uncle Sam's Figures

Some interesting figures have been compiled by the government statisticians showing the commerce of the United States with its non-contiguous territories in motor cars and parts during certain comparative periods.

During the first 10 months of this year seventeen cars, valued at $22,255, and parts valued at $1,604, were shipped to Alaska, as compared with three cars, valued at $2,875, and parts valued at $70, shipped during the corresponding period of last year. One hundred and fourteen cars, valued at $226,093, were shipped to Hawaii during the 10 months' period of this year, as against 131 cars, valued at $198,883, shipped there during the same period of 1907. The value of the parts shipments increased from $8,306 in 1907 to $20,355 in 1908. The number of cars shipped to Porto Rico during the first 10 months of 1907 was fifty-seven, the value of which was $81,089. During the same period of this year the number had dropped to fifty-four, but the value had increased to $85,555. The shipments of parts during these periods declined in value from $25,068 to $22,239.

The Philippine Islands received seventeen motor cars, valued at $17,827, from the United States during the first 10 months of this year, as against six cars, valued at $5,122, received during the same period of last year. The value of the parts shipped to the Philippines increased from $1,224 during the 10 months of last year to $7,514 during the same period of this year. These figures will serve to show the possibilities of the non-contiguous territories as markets for American cars and parts.

CRANKSHAFT MATERIALS, DESIGN AND MAKE

By Thomas J. Fay

As a measure of the utility of steel, it is possible to devise a formula such as will serve to forecast, in a modest way, the probabilities. Such a forecast might be set down as follows:

$$U = \frac{\text{T. S.} + \text{E. L.} \times \text{E.}}{10^5} = \text{Utility}$$

T. L., tensile strength; E. L., elastic limit; E., elongation.

It is, of course, necessary to make all comparisons using test specimens of exactly the same dimensions in every case. The author prefers to use the international standard, the main dimensions of which may be set down as follows:

Between enlargements=2 inches
Diameter enlargements=½ inch

To show the working of the method, it will be the idea to establish the U value of the chrome nickel steel previously taken for comparison, thus:

$$U = \frac{150{,}000 + 130{,}000 \times 12}{10^5} = 33.6$$

A very low value, due to heat treatment of the steel.

It is not the purpose here to set down in black and white the unqualified statement that high elongation is an absolute sign of kinetic ability irrespective of any other consideration. It is fair to say that the absence of this property is in the absence of kinetic ability. Looking at the matter from another angle, it is to say,

$$\frac{\text{Elastic Limit}}{\text{Elongation}} = \text{the lowest possible value in the best possible steel.}$$

For the steel just taken this value would be as follows:

$$\frac{130{,}000}{12} = 10{,}833$$ which is a rather high value for the class of steel represented, but the same class of steel is prone to go wrong in this direction; 5,000 would be a good value.

Acid Open Hearth Steel

Take carbon steel and fix upon its utility factor U under changing conditions of the carbon content. To begin with, it will be necessary to fix upon the physical properties under the several conditions of the carbon content, which will be as follows:

Points carbon	Tensile strength	Elastic limit
10	55,000	28,000
20	65,000	32,000
30	75,000	37,500
40	85,000	42,500
50	95,000	47,500

Points carbon	Elongation per cent in 2 inches	Utility rating
10	30	24.9
20	26	25.3
30	22	24.75
40	19	24.22
50	17	24.22

The figures taken were picked more or less at random from tests of carbon steel, which, however, does not debar their use for the intended illustration. What we find is that according to the method employed the value of U is not changed substantially by changing the carbon content. Of course, by treatment the values are lowered when desired, but it can be shown that the U value will be nearly the same, irrespective of the changes, so long as the steel is not alloyed.

A genera of steel, then, has its own utility value, and if a greater value is desired it is necessary to alter the chemical composition of the product. It will be possible to say that there are any number of cases in which the tests would show a substantial departure from the values as here given. This fact does not make the method wrong; indeed, it would show that some of the steel might be below the quality possible of attainment in good practice, or it might show an occasional test of steel better than can be expected in the general run of things.

In further proof of the accuracy of the scheme it is only necessary to compare the results attained by the usual manipulation of a given specimen of steel, such as the following.

Tests of Carbon Steel

The tests of a specimen of 44 points carbon steel show results as follows and the U values as calculated by the author show substantially constant for all, no matter what the treatment:

STEEL IN THE NORMAL STATE

Tensile strength in pounds per square inch	92,000
Elastic limit in pounds per square inch	36,000
Elongation (per cent)	19
Utility value	24.32

WATER QUENCHED AT 850 C. AND ANNEALED AT 550 C.

Tensile strength in ponds per square inch	156,000
Elastic limit in pounds per square inch	92,700
Elongation (per cent)	10
Utility value	24.87

OIL QUENCHED AT 850 C. AND ANNEALED AT 550 C.

Tensile strength in pounds per square inch	126,000
Elastic limit in pounds per square inch	70,000
Elongation (per cent)	13
Utility value	25.48

It will be observed that this utility rating, or value, as it is termed for want of a better name, hangs to the carbon steel with great tenacity at or near U=24. It is true, however, that very low and very high carbon contents are prone to influence the results.

There is one other point of moment to take into account, i. e., each genera of steel has its own figure of merit, such as ought to be reached, else it would be possible to say of the steel, it is not up to the customary standard of merit. These values can be set down about as follows:

1—Swedish iron	34
2—Carbon steel	24
3—Nickel steel	34
4—Vanadium chrome steel	44
5—Chrome nickel steel	54
6—Special alloy steel	64

1. Swedish iron and some brands of English iron as Farnley are possessed of a higher U rating than any of the grades of carbon steel. It is on this account, perhaps, that Lemoine and others were wont to use iron in motor car construction, be it said to their credit, with more than a little success and with good results.

2. So variable in its character as not to lend confidence, either in the matter of fixing a rating or in the use of the steel.

3. A very stable rating in the grades of nickel steel holding a low carbon content, that is to say, with carbon below 16 points.

4. Subject to considerable variation, especially if the carbon is somewhat high, or, in treated products.

5. The author never found more than one grade of alloy steel in which the U rating reached the high value here given.

6. The carbon content does not alter the rating materially, even considering wide variations of the same. Heat treating does not increase this rating over and above what it should be in well-fabricated normal steel. Heat treating, however, will readily decrease the rating.

Crankshaft Steel Conclusions

Without further reasoning we can reach some conclusions as follows: Crankshaft steel should have a low carbon content; the tensile strength should be high; the elongation should be high; the U rating should be high; the unit stresses should be low, very low indeed; the elastic limit might be low without detriment if kinetic ability may not be reduced thereby; the steel should be well fabricated; the low carbon would indicate higher manganese and some alloying.

The general inference is that the tensile strength should be high and that the initial rigidity will be a maximum. The elongation should be high since kinetic ability might then reside in the steel. The elastic limit is not so important provided the unit stresses are established by designing at a very low point. Low carbon indidates ability to manipulate the steel without danger of destroying the good qualities of the same.

Heat Treatment

The desired heat treatment is that which will increase tensile strength and elongation at the expense of elastic limit in such a way as to improve kinetic ability, referring, of course, to crankshaft work. The following table shows that it is possible to do so:

Condition	T. S.	E. L.	Ex.
Normal	65,000	29,100	27.2
Annealed	67,000	40,000	30.9
Treated	78,800	30,900	22.1
Treated	71,900	25,300	27.8

Identification—Manipulation of carbon steel in which the carbon content was 16 points, as reported by "Brinell."

An inspection of the test shows that the tensile strength can be increased at the expense of the elastic limit without affecting the elongation. The test also shows that the U value will not be diminished in the process below the customary point. The difference as between oil and water quenching, with subsequent reheating, was well illustrated in this case. Alloy steel if treated at the temperature suitable for its qualities would be quite as or even

more susceptible. Finally, it may not be too much to say the whole discussion rather goes to show that it is the mal use of steel that ends in disrupted crankshafts rather than a question of the materials to use. It is a fact, nevertheless, that very effective results might follow were the steel somewhat especially fabricated for the work, although it does not follow that the best steel for the purpose will necessarily have to be the hardest and the strongest steel possible to procure.

Bearings and Material

Discussion in relation to the question of the relative value of plain and ball or roller bearings is a matter that cannot well be advanced to any definite conclusion without considering the materials used in the crankshafts. In a word, if plain bearings are to be used the material of the crankshaft will have to be of the kind or in the condition such as will allow of the use of plain bearings. It is probably well understood that there is a great difference in the performance as between steel in the normal state and the same steel in some one of the several conditions in which it can reside. Pearlitic steel—steel in the pearlite state—is generally regarded as a poor material for use in bearings. All untreated steel, if the carbon content is below 90 points, is of the pearlitic genera and is not the best for bearing work. True, there is a considerable difference as between the various brands of pearlitic steel. For instance, a well-fabricated steel will serve better for a bearing than will the same steel not well fabricated.

Wootsite For Plain Bearings

Wootsite, or steel in the Marientistic state, may be far better for bearings of the plain type, but it must be remembered that these conditions are the product of a special heat treatment. This special heat treatment is not always afforded, and it is not always a fact that the crankshafts are in the best possible state. With ball or roller bearings these are not matters of moment since the journal portions of the crankshafts do not have to do bearing work. In other words, where the materials have to do special bearing duties they are heat-treated to bring about the desired condition. If it is true that in ball bearings the steel has to be rendered as Wootsite to afford the desired results, then it is equally true that plain bearings should be rendered suitable. It is not the purpose here to maintain that any one of the intermediate conditions will best serve the purpose more than to say that for the best results in bearings the steel has to be heat-treated, which involves a quench from some high temperature and subsequently the steel has to be "let down." It is some intermediate condition due to "letting down" or tempering that is sought in order that the steel will be in the best possible condition to do bearing work. As before intimated, in ball or roller bearings this matter is attended to since they are heat-treated and in them the material resides in the best state for bearing work.

These are all matters besides the question of the strength of the crankshafts and they are of even greater importance since a crankshaft is of no value at all if the bearings fail to work in a satisfactory manner. It is not uncommon to hear the statement made that the Babbitt lining in the bearing proper is of some wonderful grade that assures entire freedom from bearing troubles of every kind. There is nothing in such a statement unless the materials of the crankshaft—journals—are also suited to the purpose. Of course, it would be an unjustifiable expense to use such fine materials as go into ball bearings, of the grade that are used in crankshafts, for crankshafts and, again, such materials are not so good for the purpose under the conditions in which a crankshaft has to work as they are in ball-bearing work. It follows that the best combination is one involving the materials for crankshafts of a highly kinetic character and of great rigidity in combination with materials of the highest bearing qualities in the ball or roller bearings, the latter from the bearing point of view only.

Composition of Bearing Material

It is a well-known fact that materials for ball or roller bearings are not suitable for crankshaft work. It is equally well known that the ball or roller bearings are made of the best materials for the purpose. How, then, can the best possible results be realized without actually resorting to the use of the special bearings; that is to say, the ball or roller bearings? Without stating definitely the composition of materials for ball bearings, it is fair to say they take into account the carbon content at a point bordering upon free cementite with the steel in the normal state. Free cementite presupposes carbon above 90 points, and in such steel it is out of the question to consider the same as suitable for use in what are known as machine members, in which the dynamic conditions are such as to include bending, sheering and torsional moments. Statically, this material will serve very nicely, or, if the moments are as in a ball bearing, the results are very fine, as has been proved in practice.

Ball-Bearing Crankshaft

Reducing the carbon reduces the ability of the balls and the races, and as a result it is plain that the materials that serve best for ball, and, roller bearings, are the least suited for crankshafts. Logically, then, the ball-bearing crankshaft is something to take into account. The reason for this should be quite clear, since it enables the designer to use crankshaft materials of a highly kinetic character that is easy to work, and ball-bearing materials that are exactly suited to the work.

At this late day, to discuss the feasibility of the ball-bearing crankshaft is a waste of time. They have been working for several years, and few indeed are the cases in which they gave any trouble at all.

Fate of Salon in Balance

Paris, Dec. 17—It is now for the Automobile Club of France to decide whether there shall be a salon in 1909. This week a deputation of nine of the leading constructors, representing Renault, de Dietrich, Panhard, Delaunay-Belleville, Brasier, Motobloc, Gobron and Bayard-Clement, waited on Gustave Rives, organizer of the salon, and informed him that a large number of important firms had decided to take no part in any show next year, and requesting that no salon be held until 1910. The only reply that could be given by Rives was that he would communicate the wishes of the deputation to the Automobile Club of France which would consider the matter and give a decision at an early date. The chief mover in the Paris shows took the opportunity of pointing out that even if the Paris salon were abandoned it was not likely that London would consent to cast off its annual exhibition, thus it would still be necessary to create new models every year whether they could be exposed at Paris or not. Small car builders also have met to consider which party they shall support, but were unable to come to a decision. The accessory men are strongly in favor of a show, while aeroplane constructors believe that a salon every year would be a valuable means of developing their branch of the industry.

AN ALLOY STEEL CRANKSHAFT—CHROME NICKEL STEEL CRANKSHAFT

MOTOR CAR DEVELOPMENT

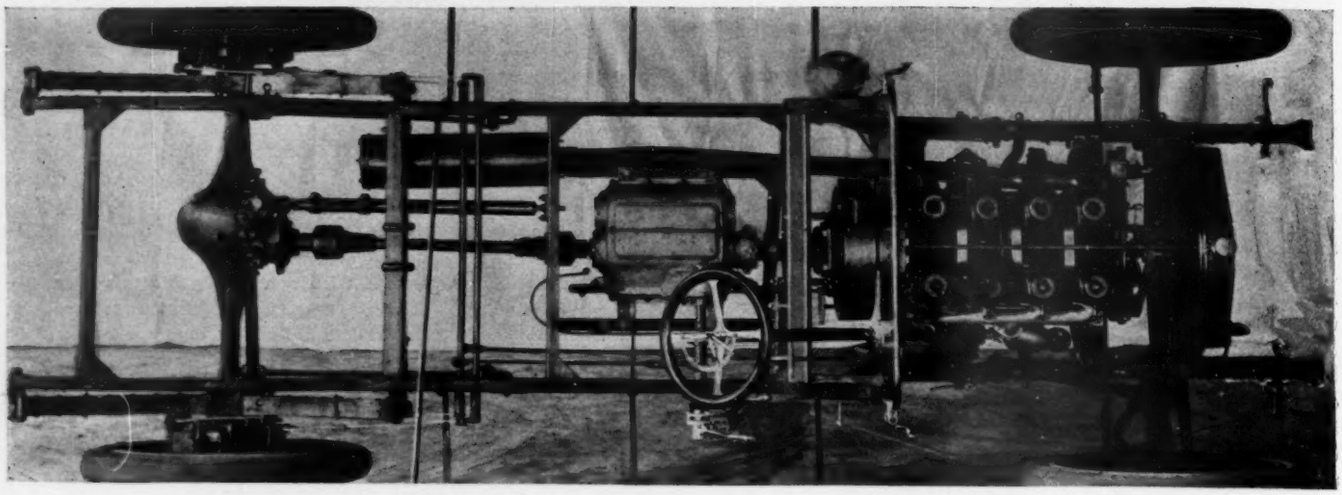


FIG. 1—CHASSIS OF PULLMAN CAR FOR 1909 WITH CONTINUOUS WATERJACKETS

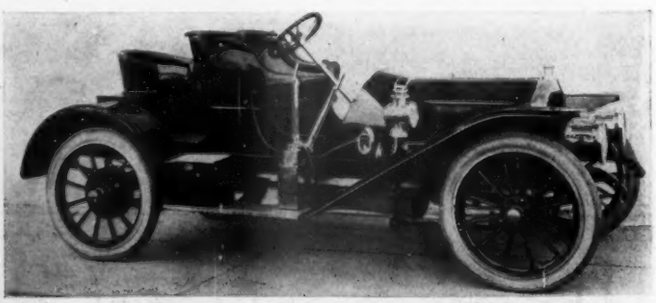
THERE will be five Pullman models for 1909, manufactured by the York Motor Car Co., Inc. Three of these models will be roadsters, one a five-passenger touring car, and the other a seven-passenger touring car. The five-passenger touring car is a new model, employing a new cylinder size, having a bore of 4½ inches, and a stroke of the same. It is rated at 30-horsepower and on formula shows 32.4. This car is not a new design, but merely a lower-powered machine than the five-passenger car which the company uses this year. It has the same motor, clutch, transmission and rear axle design, with the exception of some details, which have been used in all of the Pullman models this year, and which will be continued for 1909. With the exception of this model K newcomer, the other four York models are continued types of 1908 with slight variation. The company's policy regarding six-cylinder remains as a year ago, it manufacturing but one model—six-30 roadster, which was brought out for the first time this year. It is of interest to note that of the four carried-over models the wheelbases have not been lengthened more than an inch in any case, but in the two 40-horsepower models tire sizes have been raised from 34 to 36 inches with 4-inch sizes on the roadster and 4 and 4½ on the seven-passenger touring car.

The 1909 Pullman motors are made in three cylinder sizes, as follows:

Model K, four-30, 4½ by 4½ inches.
Model L, four-20, 3¾ by 3¾ inches.
Six-30, 3¾ to 3¾ inches.
Model M, four-40, 5 by 5¼ inches.
Four-40, 5 by 5¼ inches.

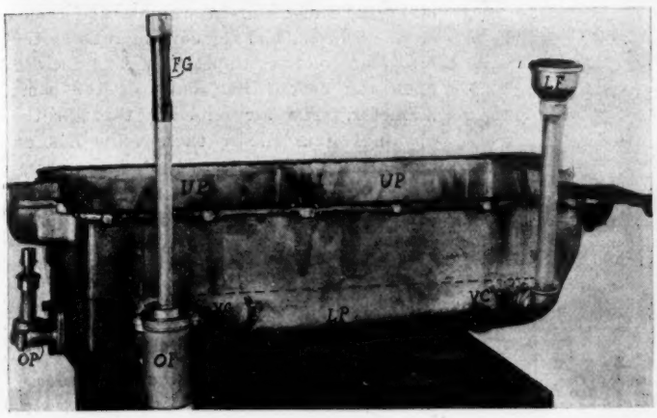
These dimensions show that the company has not been carried away with the long stroke proposition, but in three types favors the square cylinder, and in the other two uses but ¼ inch longer stroke than bore. The rating of the 3¾ sizes is at 1,000 revolutions per minute; whereas, that of the 4½ and 5-inch sizes is at 900 revolutions per minute.

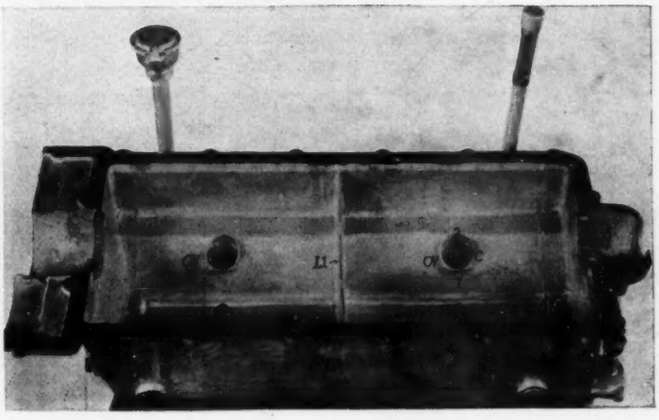
Pullman motors are conspicuous because their cooling system and their ignition system generally vary slightly from the conventional, and for next year they have installed an entirely new lubricating system, which is of the crankcase type, instead of the multi-feed oiler carried on the dash and heretofore employed by them. This system is illustrated in Figs. 4 and 5, in which the lower half of the crankcase, is divided into fore and aft compartments by the central vertical partition L1, and into upper and lower compartments by a horizontal partition approximately in the plane of the dotted line. The lower portion LP is an oil reservoir, in which the supply of oil is carried, being replenished through the lubricant filler LF, which stands at the forward end of the motor, and the level of which lubricant is shown by a float gauge FG, with a glass dial in the top supported on a vertical spindle from a float within the cylindrical chamber OF. From the oil compartment LP, a gear-driven oil pump OP delivers the oil into the upper part of the crankcase, marked UP in the illustration, and in which the crankshaft revolves. A predetermined oil level is maintained in this part of the case by means of valves OV, seen in Fig. 5, and which are controlled from the exterior of the case by levers VC, in Fig. 4, which levers rest in a serrated rack, which serves to lock them in any desired position. By varying these levers the heights of the oil level can be varied as desired from the outside. These valves are nothing more or less than a circular plug with an opening C, through which the oil can escape into the oil



FIGS. 2 AND 3—TYPES OF PULLMAN CARS FOR 1909

FIVE PULLMAN MODELS READY





FIGS. 4 AND 5—THE LOWER PART OF PULLMAN CRANKCASE SHOWING OILING SYSTEM

reservoir beneath. The opening C being near the periphery of the valves, it is very apparent that by turning the valve so that this opening C would be towards the bottom, or in position 1, the oil level would be lowered, and turning it to position 2, the oil level would be raised. The only service of the oil pump in this system is to lift the oil from the reservoir into the crankcase, where a splash is maintained which cares for the crankshaft bearihgs, cylinder walls, wrist pins, and lower connecting rod bearings. With this oiling system there is no exterior piping.

Most conspicuous in connection with the cooling system of the motor is that there is a continuous waterjacket throughout the four cylinders, in spite of the fact that each cylinder is a separate casting with an integral waterjacket. How the continuous waterjacket space is obtained is shown in Fig. 6, of the intake side of the motor, in which the front and rear face of each cylinder casting is made without a jacket part, but carries instead a flanged surface F. These surfaces are properly planed, so that when cylinders A and B are mounted, their opposing flanges F are bolted together, forming a water-tight joint, and thus establishing a common jacket between the two. This construction is continued between cylinders B and C, and C and D, and the cylinder D carries a rear plate F1, which forms a jacket for that part of the cylinder. The front cylinder A carries a plate F2, in which is the only water exit from the four cylinders and which connects directly by hose with the top of the radiator. Water enters the jackets through the rear plate, F1, the intake pipe being designated W1. With this water system there is a continuous flow from rear to front, the cool water entering the rear cylinder which is farthest away from the influence of the belt-driven fan, and also farthest away from the natural air circulation through the flat tube radiator. Water circulation throughout the system is maintained by a centrifugal pump located on the exhaust side. Using the continuous waterjacket, vastly diminishes the intricacies of the water piping, and includes the additional advantage of bracing the four cylinders, making their rigidity practically the same as though they were cast *en bloc* yet not in any wise interfering with the interchangeable nature of the cylinders.

On all of its cars, with the exception of the 20-horsepower runabout, the company is fitting two complete and separate sets of ignition, one consisting of a Bosch high-tension magneto, and the other the usual battery outfit, the current from which is passed from a single-unit coil and high-tension distributer. As this year, so next, two sets of plugs are used, one set carried over the intake valves, the other in the cylinder heads as close to these valves as possible. The motor illustration shows the fiber tube FT, which conducts the high-tension wires from the Bosch magneto to the set of plugs located in the cylinder heads. A change has been made, however, in the location of the distributer, it occupying a position between the third and fourth instead of between the first and second cylinders. Its shaft is slightly shorter than that used this season.

The transmission system of Pullman cars begins with a cone clutch faced with leather and carrying cork inserts. Between this clutch and the gearset is a universal joint. On all models, save the seven-passenger touring car, a three-speed selective set is employed, but a four-speed

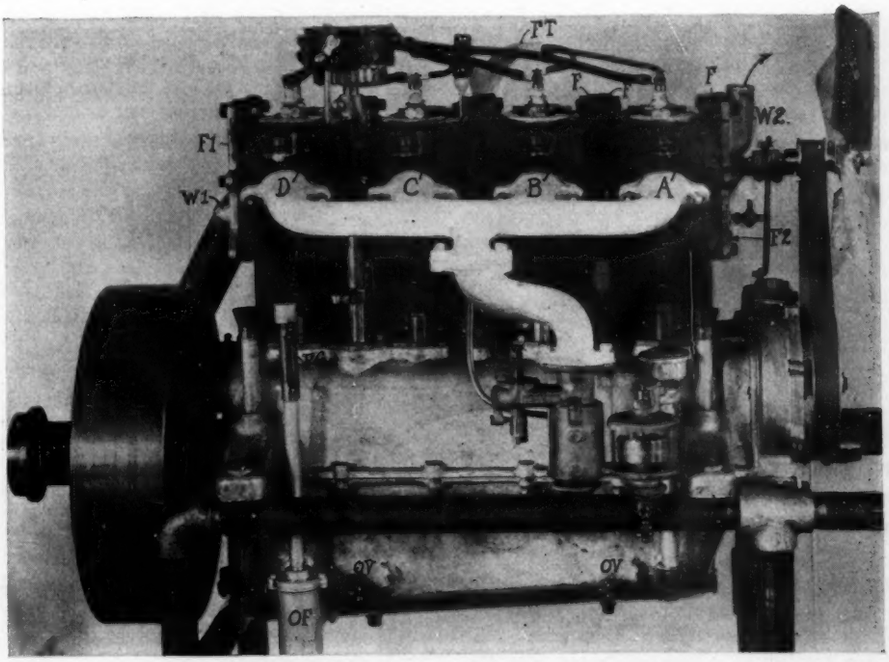


FIG. 6—INTAKE SIDE OF PULLMAN FOUR-CYLINDER MOTOR

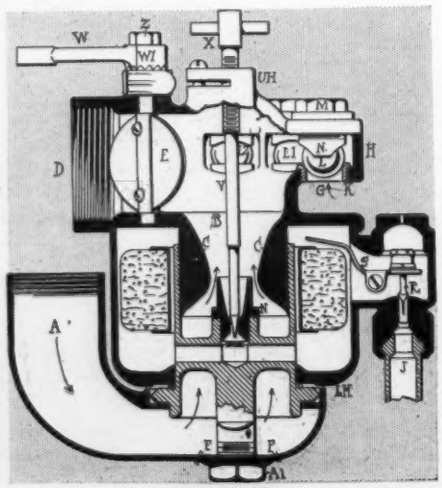
TWO ADULTS RIDING IN THE TOY BROWNIEKAR

set with direct drive on the third is used on the seven-passenger car. In all sets chrome nickel steel gears and shafts are employed, Hess-Bright bearings supporting both shafts, and the gearset is carried on the same sub-frame pieces which support the motor. Final drive is by shaft with two universal joints. In the larger models a special rear axle is employed, in which a pressed steel casing nickel steel driveshafts are used, with the torque absorbed through a V-form of rod, spanning the front part of the differential housing, and attaching to a cross member of the frame. In both of the 40-horsepower type the axle is of the floating construction; the 20-horsepower uses a Timken type of rear axle.

In running gear several minor details have been changed in the different models: the seven-passenger car employs a platform rear spring in which the cross member is in front of the axle, attaching at its center to a channel cross piece of the frame. All of the other models use semi-elliptics front and rear. The two 40-horsepower styles are fitted with internal and external rear wheel brakes; whereas, on the three smaller sizes a transmission brake is employed in addition to expanding brakes acting on the rear wheels. The I-beam axle is employed throughout. All models use the subframe construction, but the seven-passenger style has the side members dropped in front of the rear axle.

NEW KINGSTON CARBURETER

Byrne, Kingston & Co., in their 1909 carbureter, have deviated considerably from early ideas chiefly in the using of a ball type of auxiliary air valve instead of the employment of spring control, dash pot, diaphragm or auxiliary air valve. The main air intake A communicates with the vertical mixing chamber B in which the sides C are beveled outward, giving a venturi tube effect so that the air current converges above the nozzle N, as indicated by the arrows. D marks the exit to the motor controlled by the butterfly throttle E. Auxiliary air enters through five circular openings G, arranged in a semi-circle in the floor of an extension H of the mixing chamber. Each of these five openings consists of a bushing K threaded into the opening in the expansion H, and having its top beveled to receive a 5/8-inch bell metal bronze ball L, which is retained in position by a threaded bushing M, fitting in the top of the expansion H. It has a pair of downward projecting hooks N for preventing the ball getting out of position, but not interfering with the ball rising vertically when forced to do so by the pull of the motor, at which time additional air is admitted. Two others of the five auxiliary entrances are shown at L1 and L2, all of the five containing balls of the same size and weight. This auxiliary air principle, while favored with a very limited following in America, has been used on one or two French makes and one other American carbureter. In the French make balls of different weights and diameters are used, but for certain reasons the Kingston company appears to have decided upon the use of five balls of the same diameter. The air entering through the openings guarded by these balls has an unrestricted passage into the mixing chamber and thence to the motor. Any ball is easily removed by unthreading the cap M, after which the ball can be lifted out.



NEW KINGSTON CARBURETER

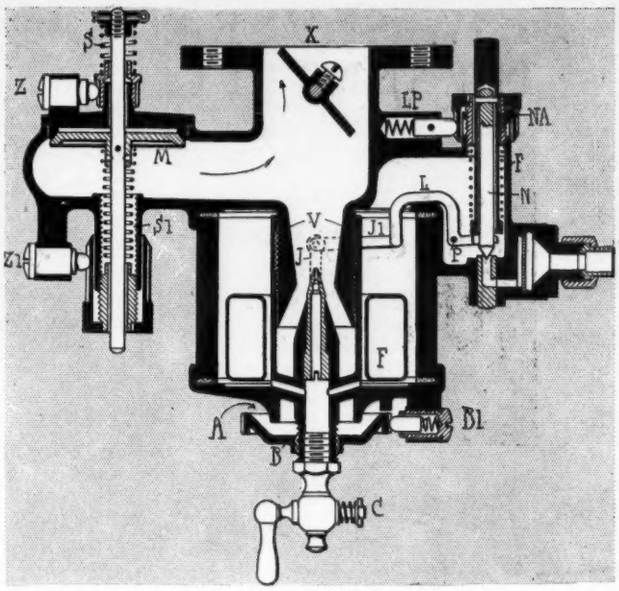
The gasoline control in this carbureter has not been altered to any extent. Its entry from the gasoline tank is by way of the connection J, which is guarded by the needle valve R, operated through a lever S, pivoted in the side of the casting and with its long arm bearings upon the top of the cork float. The float is fitted with a metal bushing. Complete control of the nozzle N is through the needle valve V, which at the top of the carbureter has a T-piece X, by which it can be raised or lowered, thereby regulating the flow of gasoline. A feature of the throttle connection W is the serrated lower face of its hub W1, so that by loosening a lock nut Z the handle W can be turned in any direction most convenient for the motor. The air intake A consists of an elbow piece secured to the carbureter casting by a nut A1, and in the base of this is a circle of openings F where currents of air can enter, the object of these openings being that by priming the carbureter and overflowing the open mouth of the nozzle N, the gasoline falls to the vicinity of the holes F and air entering through these openings will facilitate the breaking up of the gasoline, and thereby assist the starting of the motor. Having the piece A separate makes it possible to turn it to any desired angle, which the construction of the motor may call for. Structurally viewed, the carbureter body is a two-part casting, the upper part UH embracing the mixing chamber and the venturi tube portion C, whereas the lower half LH comprises the float chamber, with the part forming a spraying nozzle, and this threads into the upper portion.

NEW STROMBERG CARBURETER

The Stromberg Motor Devices Co., Chicago, has had in use for several months its new style of carbureter with a ring float encircling the spraying nozzle and mixing chamber instead of having a float carried in a separate chamber. With the positioning of the float around the mixing chamber the waterjacketing feature of the carbureter has been dropped but the glass float chamber and venturi-shaped mixing chamber above the nozzle have been continued. The new carbureter is more compact than its predecessor. In the vertical section of

it F marks the metallic ring float which controls the needle valve N through a lever L pivoted at P with the valve N carried on the short arm and the long arm made up of the curved part and the horizontal yoke part J1 which at its end pivots to vertical straps J that attach to diametrically opposite points on the float, the relation of these two yoke arms to the float being the same as when a spool standing on its end is lifted from the table by the thumb and first finger of the hand. This lever device insures a vertical lift to the float without any possibility of it binding or even contacting with the walls of the mixing chamber or the outer glass wall of the float chamber. On the original Stromberg model the float is a metal one carrying the needle valve from its bottom face. Surrounding the needle valve stem is a spring F bearing at its lower end on a flange on the valve at its upper end against an adjusting nut NA so that by lowering this nut the spring is compressed and the entire tension of compression bears downward on the short end of the lever L. This tends to raise the float F on the long end of the lever. By tightening the spring F, however, less effort is required to lift the float which is synonymous to lowering the gasoline level; so that the float level is raised by raising the adjusting nut NA and lowered by lowering this nut. This nut is retained in any position by the plunger LP, whose pointed end enters vertical grooves in the lock nut in response to a coil spring acting behind it.

So much for the gasoline system of the carbureter; next comes the air system, the regular supply of which enters as indicated by arrows A over a cup piece B into which the gasoline drips from the nozzle when primed. Once past this the air passes the nozzle, the tip of which is pointed at the same angle as the sides of the mixing chamber. A needle valve is not used in the nozzle. Once past the nozzle the mixture's course is direct upward to the motor, but before passing the butterfly throttle it is joined by the air entering past the auxiliary valve M whose action is restricted by two coiled springs S and S1, the upper one coming into action on high speeds and the lower one on low speeds. When more air is needed the valve M starts opening, restricted only by the lower spring. The valve, when opened to a determined point, has to compress the upper spring, in addition to the lower, to open further. Each spring S and S1 may be adjusted by self-locking adjusting nuts. The drip cock C is for draining the float chamber. Every adjusting screw on the carbureter is self-locking. The high-speed auxiliary air valve spring S by lock nut Z; the low-speed spring S1 by nut Z1;



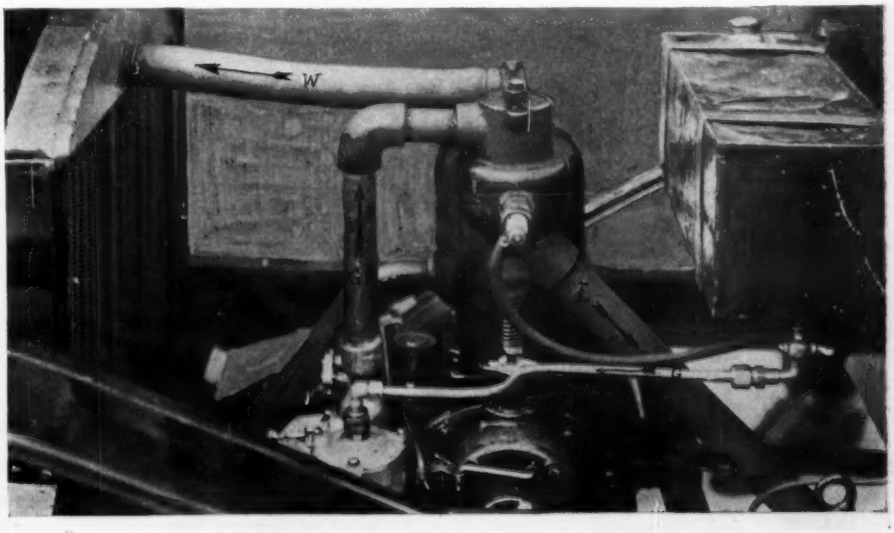
THE NEW STROMBERG CARBURETER

the regular air opening cup B by nut B1, and the needle valve spring F by NA. With all of these the nuts can be turned either way by the fingers, and the nuts with plungers lock them at several points in each revolution, by the vertical grooves in the nuts. The Stromberg company is continuing its 1908 type.

BROWNIEKAR, RIG FOR BOYS

The Omar Motor Co., Newark, N. Y., is manufacturing in the old Mora factory the Browniekar, which is best described as a little car for boys. It is a single-cylinder machine, with belt-drive, wire wheels and 66 inch wheelbase, and can travel from 10 to 12 miles an hour, while an ordinary adult can lift the front end from the ground with ease. One of the illustrations shows two adults seated in the little machine, although it is intended for children's use. Its power plant is a 3.6-horsepower single-cylinder motor, with 3-inch bore and 3½-inch stroke. The motor is well made, the walls, piston and piston rings being carefully ground the same as in large cars. The crankshaft is a drop forging; the connecting rod also is a forging, and particular care has been used in making the motor, the company realizing that, because of the car being intended for boys, particularly careful construction would be imperative. Water circulation is maintained by the thermosyphon principle, hose W sufficing to connect the vertical tube radiator with the waterjacket. The carbureter is of the regular float-feed type, drawing its supply from the gasoline tank through the pipe G, and feeding the cylinder through the pipe G1, E marking the exhaust pipe, which connects with an expansion chamber muffler. The intake valve is automatically operated, the exhaust mechanically, and throttle and spark control on the steering column beneath the wheel.

The transmission is a friction belt-drive device and consists of a pulley on the crankshaft which transmits by a 2-inch fiber belt to a pulley on the jackshaft. Motor cycle belts transmit from the jackshaft pulleys to the rear wheel. The fiber belt is made long to allow for slipping, so that with the motor running the belt will not transmit to the jackshaft. When the car has to move ahead an idler is forced against this fiber belt by a pedal, and as the belt is tightened the speed increases. This idler in reality assumes the role of a clutch in a regular car. One brake is furnished on the jackshaft which is pedal-applied. The car has an ash frame with sills 2 by 1½-inch, its tread is 34 inches, and 24 by 1½-inch single tube tires secured by four lugs are used. The front axle is an I-beam forging, with Elliott steering knuckle ends; the rear axle is a 1-inch bar of circular cross-section, and wire bicycle wheels with tangent spokes are employed. Ball bearings are used on the road wheels.



POWER PLANT OF THE TOY BROWNIEKAR FOR BOYS

REGAL CARS SHOW SEVERAL CHANGES OVER PRESENT TYPE

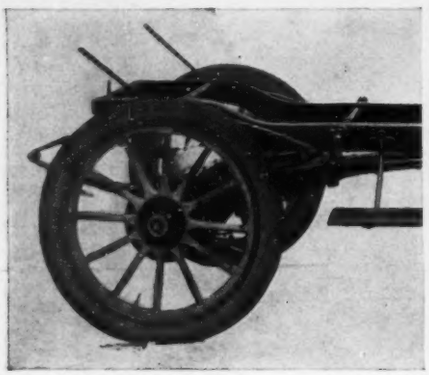


FIG. 1—REGAL REAR SPRING

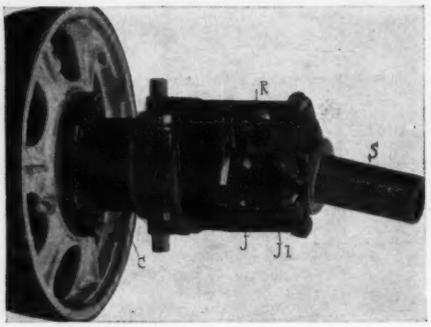


FIG. 2—REGAL CLUTCH

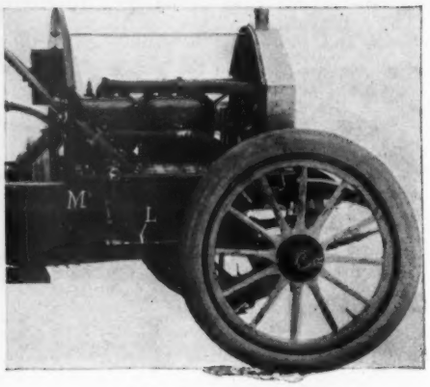


FIG. 3—REGAL STEERING

DETROIT occupies the pioneer position as the manufacturing home of medium-priced cars as well as the starting point of big productions in machines. One of the more recent factories to keep this dual watchword to the fore is the Regal Motor Car Co., which for next year is marketing four-cylinder cars with 4 by 4-inch cylinders and runabout or roadster bodies. The Regal car is characteristic of Detroit in many respects. Dating its existence only from last January, it is not so widely known as other cars made in the city, but the factory heads expect to exceed the 2,000 mark next season. The features of the car are power and approved workmanship with minimum weight and cost. It incorporates in its make-up many features found only in cars selling above the $3,000 mark and rarely looked for in those under $1,400. In the motor is used diecast bearings for the crankshaft and lower ends of the connecting rods; the cams are integral on the camshaft; helical timing gears are employed; oiling is by a system carried within the crankcase; rollers are used on the valve lifter rods; the cone clutch is of the latest design; the selective gearbox is incorporated with the back axle; the side members of the frame are dropped in front of the back axle; thermo-syphoning is employed on the motor and many other constructive details of more than passing interest, in connection with the car, could be enumerated.

Cooling and Lubrication

Of paramount interest in connection with the motor are the cooling and lubrication systems. In the thermo-syphoning process water enters the jackets at the non-valve side, a 2-inch hose connection H—Fig. 4—leading from the base of the radiator to a tubular T piece on the front twin casting from which a hose length forms a water duct to an elbow casting L on the rear twin casting. The return pipe R is in the form of a horizontal Y, the spreading arms of which are 1½-inch hose lengths Hl that connect from the top of the front twin casting to the sides of the radiator; whereas the straight part R of the Y is a length of hose leading from the rear cylinder casting to the front one. The branches of the Y do not enter the radiator at its high point but on a level with the top of the vertical sides of it so there is considerable of the radiator capacity above the point where the hot water from the jackets enters it. The entire return piping is level and not inclined toward the radiator as in most pump systems. A neat part of it consists in making the jacket heads of removable plates P cast integrally with which are the stub tubes S with which the hose connections attach, so that the entire piping system is hose with the exception of these. The hose is not of nearly so large diameter as in some other motors with thermo-syphon coating, but from use appears to be equal to the demand.

In the lubricating system the lower part of the crankcase contains an upper and a lower compartment, the upper constituting the portion into which the crankshaft throws dip, the one beneath it being an oil chamber from which a gear pump lifts the oil and delivers it through a copper tube within the crankcase which has branches leading to the main bearings of the crankshaft. This tube parallels the crankshaft and lies at about the same height within the case. As it is of large capacity, as are the branches from it to the crankshaft bearings, there always is a liberal supply for these and the lower connecting rod bushes. The splash cares for the cylinder walls, piston rings and wrist-pins. Once used, the oil furnishes the splash and when a determined level is reached it overflows into the oil chamber whence it is re-circulated. The motor exteriorally is entirely free from oil piping, the only evidence of a lubricating system being the vertical shaft between the flywheel and the crankcase on the bottom of which is carried the oil pump OP with the timer on the top of it.

Apart from these two characteristic systems the motor does not stray beyond the

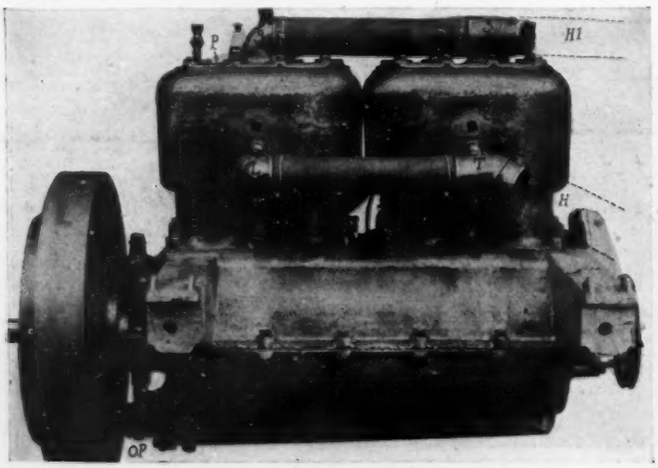


FIG. 4—REGAL WATER SYSTEM

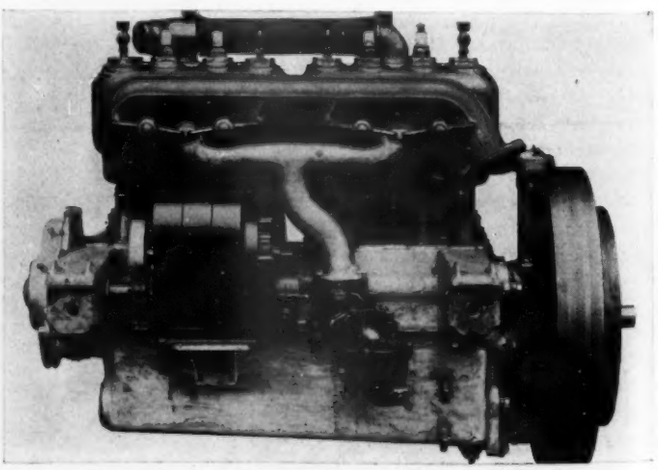


FIG. 5—REGAL VALVE AND CARBURETER SIDE

realm of the conventional. The cylinders are twin castings with interchangeable valves on the left side, on which side also are grouped the Buffalo carbureter and Remy high-tension magneto, together with the intake and exhaust manifolds, leaving the sole decoration of the right side the intake water hose. The upper part of the crankcase is a gray iron casting instead of an aluminum one, which metal is used in the lower part. The crankshaft is of the dropped forged three-bearing type; the forged camshaft with its integral cams has these case-hardened and ground on a form grinder to insure perfect interchangeability in different cars. The use of enclosed helical gears on the crankshaft and camshaft is to reduce noise. A dual ignition outfit is installed consisting of the new type of Remy magneto with its non-vibrator, single-unit, dash coil and the current delivered to the plugs through the magneto distributor. In addition to this is the battery equipment with timer on the motor.

Flywheel Cone Clutch

The flywheel cone clutch has a leather facing with flat springs beneath the leather. The engaging spring is self-contained, being within the tubular casing C Fig. 2. The lubrication is effected by filling this case with lubricant. In rear of the clutch is a slip joint—the cross pin J sliding in slot J1 when disengaging the clutch. This pin forms two arms of the joint cross, the other two R being round and bearing within the yoke end of the shaft S, which, referring to Fig. 6, has a bearing at S on a crosspiece of the frame. Immediately in the rear it takes a universal joint, which is located within the spherical part H. The bell-shaped rear of the malleable casting contains a three-quarter ball end on the forward end of the torsion tube T; see Fig. 6. This tube T encloses the propeller shaft and at its rear attaches rigidly to the front end of the gearbox, which is incorporated with the differential casting. The ball-and-socket support on its front end gives a partly universal attachment of the entire rear axle

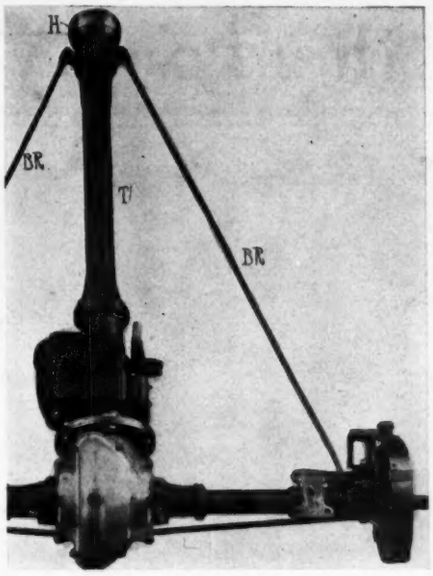


FIG. 7—REGAL REAR SYSTEM

part. The two triangular brace rods BR, Fig. 7, to the axle ends add rigidity to the entire system. Should one rear wheel pass over an obstacle this ball-and-socket acts as the pivot point and the strain is not transferred to the frame. Because of the absence of radius rods from the axle ends to the side frame members and the employment of elliptic rear springs all of the driving is done through the torsion tube.

Gearset of Selective Type

The gearset is a conventional selective design with triple forward variations, with gear shifter rods encased and with interlocks attached. The back axle is not a floating construction, the rear wheels being anchored to the ends of the driveshafts, which are carried on Hyatt roller bearings. The top half of the differential housing is removed and compression grease cups are furnished for each axle bearing. On this axle are two sets of brakes, internal and external, the sets operating through cross rod and sleeve which pass through the frame side members at the front of the elliptical springs, making the linkages to the brake levers outside of the frame specially short and direct as the plan view of the chassis reveals.

The forward axle is a tubular construction with the drop outside of the spring seatings and the knuckle design allowing of carrying the tie rod back of the axle. Commendably neat about the steering gear and indicated in Fig 3 is carrying the steering gear so that the sector shaft M is above the side member of the frame and the link L passes above the front axle instead of underneath it, thus placing this vital part of the control well up out of harm's reach, and incidentally following a custom which is being set by many.

The Regal five-passenger car is made with straight line body, wood dash and radiator almost over the front axle. The roadster carries a hood dash and small rumble. In addition to these models, built with 105-inch wheelbase, the company will continue its present model C taxicab, and a toy tonneau will be ready soon.

NEW TIMKEN BEARING

The Timken Roller Bearing Axle Co., Canton, O., has brought out what is termed as the short roller bearing adapted to parts of a motor car which heretofore would not permit the use of a regular Timken roller owing to its length. This new bearing is now appearing with the regular improved 1909 Timken features and is made from nickel steel, carefully carbonized and heat treated, with the rollers ground to within .005-inch diameter at the mid point. The size of these new bearings is such that the space required is 1 1/32-inch for the smallest size and $1\frac{3}{16}$-inch for the largest.

NEW GASOLINE TANK

The Air-Tight Steel Tank Co., of Pittsburg, is putting on the market a storage tank for gasoline. The tank is buried in the ground and the gasoline is forced out by air pressure instead of by a suction pump. As soon as enough gasoline has been drawn the simple opening of a valve on the air pump releases the pressure and lets the gasoline in the piping flow back into the tank.

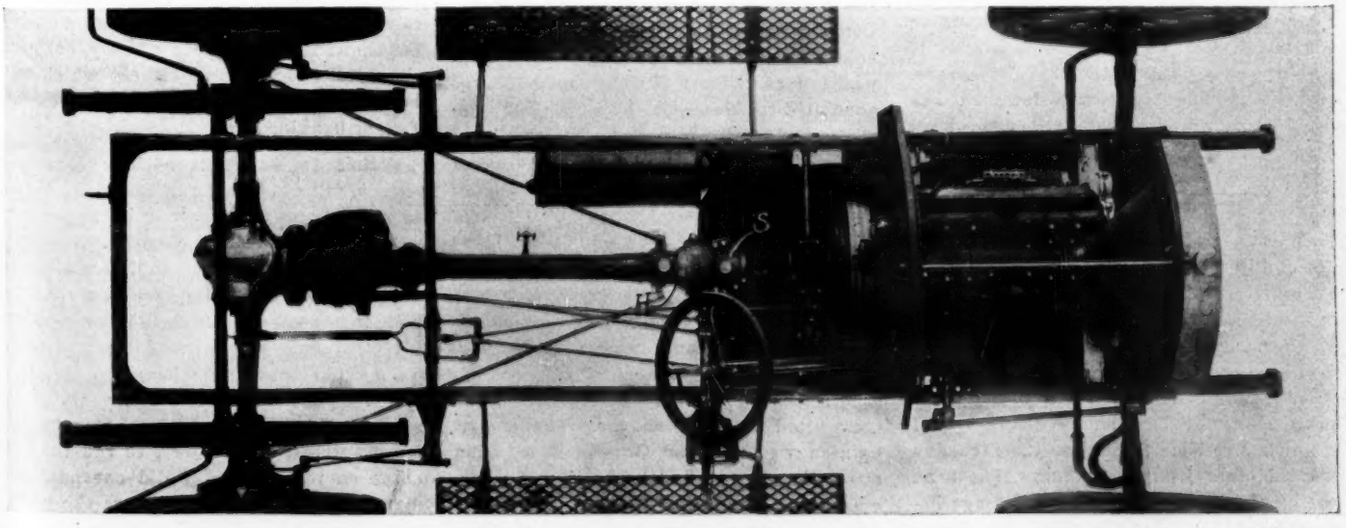


FIG. 6—PLAN ILLUSTRATION OF THE REGAL FOUR-CYLINDER CHASSIS

From the Four Winds

N S E W

KING AND QUEEN OF SPAIN AND THEIR RENAULT

Banquet at Warren, O.—The Trumbull Automobile Club, of Warren, O., has secured F. T. Sholes, president of the Ohio State Automobile Association, as the chief speaker at its banquet to be held in February.

Carnival at Sandusky—An event in Sandusky motoring circles which promises to be of considerable interest is a carnival which is being arranged for January 20, the feature of which will be an address by Driver Schuster, of the Thomas car, the winner in the New York-Paris race.

After Road Signs—The Automobile Club of Johnstown, of Johnstown, Pa., is taking the initiative in the movement to get cross-roads signs at all crossings within a radius of 50 miles of that place. Other clubs in western Pennsylvania are following similar tactics and will send committees to the state legislature this winter to urge more definite action on this point.

English War Still On—The differences between the Royal Automobile Club of England and the more democratic Motor Union are still unsettled and each body is seeking the support of the provincial clubs. A large number of these, however, has decided to associate with the two head organizations conjointly, or else not at all, and this evidence of opinion probably will lead to a peaceful settlement.

Fighting Headlights—The unnecessary use of big acetylene lights on city streets has of late become a grave public nuisance in London. The authorities have made the first move by entirely prohibiting the lighting of headlights within the city, and other municipalities are likely to follow suit. Many devices have been patented from time to time to obviate the excessive upward glare from these lamps, but none has attained popularity. To encourage improvement in this direction, the Royal Automobile Club is organizing a competition of headlights and of anti-dazzle attachments, the date being fixed for early in the new year.

Newton Will Quit—Newton, the English driver, has decided to retire from the racing game, but before then he is anxious to place the two 90-horsepower records at a figure far above their present level. Several times lately he has put the big Napier Sampson up to a 120-miles-per-hour gait for the ½ mile at Brooklands, and it is possible that as much as another 10 miles an hour may be added, given favorable weather conditions.

Want State Road Control—A meeting of the legislative committee of the County Commissioners' Association of Indiana was held in Indianapolis on December 18 at which a committee of four members was appointed to meet with the legislative committee of the Indiana bureau of good roads. The two committees will draft a law calling for the creation of a state highway commission and placing the building of all roads in the commonwealth in the future under state control.

Patent Fight Rumored—Three years ago much stir was caused by the announcement that the manufacturers of the Mercedes cars were about to institute proceedings against all British makers whose cars were fitted with gate change. The general opinion was that the German firm had a strong legal case, and hence it was somewhat surprising to find that the matter was allowed to drop. Now it is stated that immediate action is to be taken, and the probable result will be that, with the exception of the Daimler company, which holds a separate valid patent for its gate change, all British makers will pay royalty.

Cement Track Planned—As soon as Secretary Moone and President Perkins, of the corporation owning the Narragansett park track, return from the south work will commence on the $50,000 track which will take the place of the famous horse racing oval at Narragansett park, at Providence, R. I. Mr. Moone already has purchased $2,000 worth of cement which will be used in covering the entire mile circuit and in banking the turns.

Claims to Be Pioneer—John Edwards, seriously ill at his home in Rochdale, Mass., says: "I was the first man in the country to invent a horseless carriage. I was a locomotive engineer and it was while running my engine that the idea of a road vehicle to be run by steam came to me. After I retired from the railroad I set to work on my old hobby, the horseless carriage, which I perfected after a few years' work so it would run. I was forbidden by the state authorities, however, to run the machine on the streets. I did not push the matter and when in later years the motor cars began to look up I was too old and

feeble to continue the work on my steam machine which I demonstrated, however, could run.'' Edwards is 81 years old.

More Time Given—Treasury department regulations of November 27, 1907, providing for the allowance of drawback on motor cars manufactured by Brewster & Co., of New York, have been extended, as far as applicable, to cover motor cars manufactured by or for the Auto Export Co., with the use of various imported parts and materials in accordance with their sworn statement filed with the collector of customs at New York. This has just been announced.

Hoosiers Are Hustlers—Apparently Madison county, Ind., is trying to gain the distinction of building more new roads than any other county in the Hoosier state. Contracts have just been let for twenty-five new roads to cost $80,000. Since the 3-mile road law went into effect in 1907 there have been 120 roads built in the county at a cost of aproximately $1,000,000. An effort will be made to repeal the 3-mile road law, under which the roads were built, at the coming session of the legislature in January.

Meeting of Engineers—Tuesday, January 5 has been set as the date of the first session of the fourth annual meeting of the Society of Automobile Engineers, and in accordance with the program outlined by the local committee, the members will assemble at the Automobile Club of America at 10 a. m. on that date. The entire forenoon will be devoted to tests of different cars to be selected later by the committee on the club dynamometer, these tests being carried out under the supervision of Henry Souther. Following this there will be the usual business meeting and a technical session during the afternoon, the subjects to be discussed being the ''Economies of Weight Reduction,'' by F. D. Howe; ''The Factor of Ignition Apparatus,'' by A. Atwater Kent; ''Requirements of Motor Car Brake Construction,'' by Thomas J. Fay and Lawrence Whitcomb. Immediately following the conclusion of the reading and discussion of the papers in question, the meeting will adjourn for the annual dinner given by the society. This will be held at the Automobile Club of America. After the dinner the meeting will adjourn to Tuesday, January 19. The purpose of this second session is to enable members from distant points, who will only be in New York for one or the other of the shows, to attend the meeting. The clubhouse of the Automobile Club of America will again be the meeting point and the hour will be the same—10 a. m. A similar series of tests will be carried out on various cars during the morning, while the subjects on which papers have been prepared for the afternoon session are as follows: ''An Improved Type of Compression Coupling,'' by W. S. Noyes; ''Standardizing Motor Car Motor Bearings,'' by

FRITCHLE IN THE ALLEGHENIES

S. P. Wetherill, Jr.; ''Some Practical Considerations in Autogenous Welding,'' by Henry Cave, and a ''Continuous Form of Engine Indicator,'' by S. W. Rushmore and H. L. Towle.

Ohio Election—The Hancock County Automobile Club, of Ohio, has elected the following officers: President, R. E. Taylor; vice-president, Dr. W. B. Keater; secretary, F. M. Barnhart; treasurer, F. J. Collingwood; executive committee, Dr. C. W. Thomas, A. J. Gutchinson, Harry Bennett and John B. Heimhoffer.

Wins His Bet—John S. Harrington, of Worcester, Mass., president of the Chalmers-Detroit Motor Car Co., of Rhode Island., won a unique wager last week from a Worcester insurance man. Mr. Harrington went to the Detroit factory to get a car waiting for him and before he started the wager was made he could not drive the car from Detroit to Worcester, 850 miles, in 10 days, the conditions being that the car could only be operated in the daytime, no night traveling being allowed. It was a 40-horsepower roadster and though Harrington encountered all kinds of trouble on Canadian roads he made the trip much to his own surprise in exactly 5 days.

New Rambler Breaks Record—The new Rambler Forty-four roadster, the latest product of Thomas B. Jeffery & Co., has started the season on the Pacific coast by breaking the round-trip record between Los Angeles and San Diego. The trip was made in 45 minutes less than the record time previously made by a six-cylinder car. The distance is 331 miles and the Rambler time was 10 hours and 32 minutes.

Providence Wants a Test—The announced plan of the Rhode Island Automobile Club for an endurance and reliability test in the near future has aroused widespread interest among the club members. Although nothing really definite has at present been worked out, still the project is crystallizing into the form where a result will soon be effected. The members have expressed themselves as favorable to the idea and are awaiting the report of the committee on races, tours and runs upon the plan.

English Club Growing—The membership list of the Royal Automobile Club has just reached the 4,000 mark, a figure not approached by any other club of the sort in the world. The number of the official gazette which gives this information also shows that the club's declaration of war against the inconsiderate driver is being acted upon. Legal proceedings have been taken in two cases of dangerous driving and the heavy fines inflicted are bound to have a deterrent effect on the road hog fraternity.

Every Little Bit Helps—The Jefferson county board of supervisors, Wisconsin, has purchased special road-making machinery from the Austin-Western Co., of Chicago and Harvey, Ill., including a portable stone crusher, a 10-ton motor roller, a steam grader, rooter and plow. A steam shovel also will be purchased. This is done under authorization of an appropriation to assist the good roads movement in Wisconsin. County Highways Commissioner A. R. Hoard, an enthusiastic motorist, secured the appropriation.

FRITCHLE ELECTRIC NEAR JOHNSTOWN, PA., ON WAY TO NEW YORK

The Realm of the Commercial Car

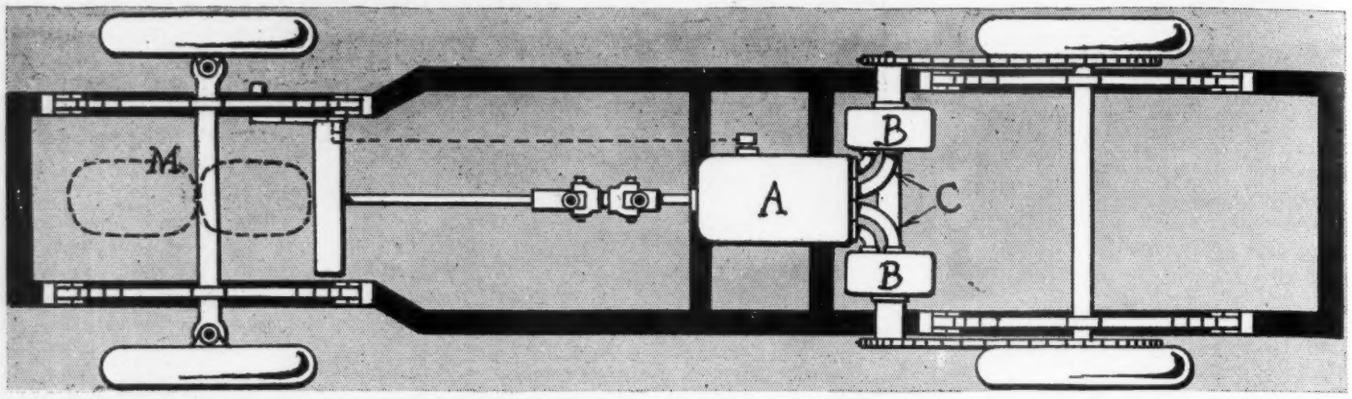


FIG. 1—PLAN VIEW OF CHASSIS FITTED WITH MANLY HYDRAULIC TRANSMISSION

Manly Hydraulic Drive

THERE has been operating in the city of New York for a couple of years a 2-ton truck which has a gasoline engine but is without a clutch of any nature, a gear or friction transmission, a differential or brakes. During this time the truck has traveled 3,000 miles under a gross load of 8,500 pounds and the 34 by 4-inch solid rubber tires have worn less than $\frac{3}{16}$ inch radially during that time. A 5-ton truck of the same design has been operating over the Gotham streets during a shorter time, and it, too, has been showing the same economy. The crux of the situation in connection with both of these trucks is that they are fitted with a hydraulic type of transmission which is the coupler between the motor and the two rear drive wheels, or all four wheels of the car if they are needed for driving. In this transmission the gasoline motor, located in front as in the standard motor car, pumps oil instead of driving through a cone or disk clutch and through a selective, sliding, planetary or friction gearset.

Illustrating the Scheme

Fig. 1 illustrates the scheme: M is a four-cylinder gasoline motor which through a shaft connects direct with an oil pump A. This pump drives two oil motors B, each of which connects by chain with its rear road wheel. Between the pump A and the motors B is a series of piping C through which the oil is circulated from pump A to motors B and returned. In driving the truck there is but one control lever K, Fig. 3, which governs the hydraulic transmission system; the lever, in neutral position, allowing the truck to stand idle with the gasoline motor still running and is advanced for forward speeds and pulled back for reversing. The rate of speed forward or back depends on the amount of forward or back movement given the control lever. In a whole day's travel the speed of the gasoline motor need not be varied, it not being necessary to reduce its speed when slowing down the truck or to increase it with every demand for additional power on a slow speed.

Pump Idea Explained

Fig. 2 illustrates the pump A referred to in Fig. 1. It consists of a stationary casting, which in the present machines comprises five cylinders D radiating from a cylindrical crank chamber. Mounted in each of the five cylinders is a piston P united by a connecting rod to the one offset on a crankshaft K, the five connecting rods attaching to one throw of the crankshaft instead of to four as in a four-cylinder gasoline motor. Formed in the main casting at the side of each cylinder is a valve chamber containing a valve and all of these five valves are connected by their connecting rods to a single crank driven directly by the pump crank.

Each of the motors B is exactly like the pump A, except that the stroke of the pistons in them is double that of the pistons P in the pump A. The crankshaft K of the pump A connects direct to the gasoline motor and so always revolves at the same speed. Variations in the speed of travel of the truck are accomplished by varying the length of the stroke of each of the pistons P in the pump A. This is done by a special construction of the crankpin or offset of the crankshaft K by means of which the length of the piston travel can be varied from maximum to zero, at which latter time the crankpin is concentric with the bearings of the crankshaft, at which time the rotation of the crankshaft produces no reciprocation of the pistons. In contrast with this variable-stroke feature of the pump is the fact that the stroke of the pistons in the motors B cannot be varied and it is therefore necessary to furnish or pump to each a definite quantity of oil to rotate it once or, in other words, make one complete rotation of its crankshaft. But these motors B differ from the pump A in one detail, namely, they possess a piston stroke exactly twice that of each piston of the pump A. There being two motors, one for each rear wheel, when the pump A is set to give its pistons the maximum stroke—at which time they pump most oil to the motors B—the pump A makes four revolutions to one of each motor B.

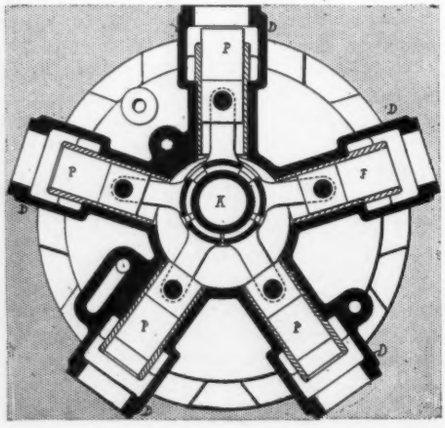


FIG. 2—THE MANLY OIL PUMP

Speed Variation Possibilities

The possibilities of speed variation because of the changes that can be made in the length of the pump strokes is the most interesting flexibility factor of the device. If the crank of the pump A is adjusted to one-tenth of its stroke the pump must make forty revolutions in order that each motor B completes one revolution; further, should the pump A be adjusted to 1-100 of its stroke the pump would have to make 400 revolutions to one of each of the motors B. By so varying the piston travel in the pump any speed variation is possible, but if further control were not fitted it would be necessary to fit some intermediate gearing to reverse the truck. This is not done, but by a simple method of connecting the pump valve crank to the offset of the crankshaft K reverse speeds are obtained. By vary-

ing the stroke the same scale of variations is obtained as when driving forward. A maximum of one-quarter the maximum forward speed is provided for the speediest reverse.

System of Operation

So much for the constructive details of the Manly system. Next come considerations of its system of operation. Foremost in this is the fact that on slow speeds its torque increases as the speed decreases. When traveling, for example, 2 miles an hour the stroke of the pistons in the pump A is very short, but the quantity of oil so furnished all goes to the motors B, every bit of it doing work, and none of it being by-passed back to the pump A as has been done in some of the other systems of exploited hydraulic drive. The drive resembles electric cars in this respect, but the Manly goes beyond the electric in that it has greater available power in its gasoline motor than that offered by the batteries of the electric machine. With the hydraulic system great initial power for starting with heavy loads or on steep grades is at hand.

With a hydraulic transmission it is not imperative to change the crankshaft speed of the prime mover—the gasoline engine—and it can run continually at its most efficient speed. In a sliding gearset, if the motor speed is reduced to make the vehicle speed slow instead of shifting gears, the motor power will fall off because it is turning over below its speed of maximum efficiency. If gears are shifted, in 90 per cent of the cases an indirect train of gears is required to trnasmit the power.

Stopping the Car

In the Manly system, to stop the car the valves are thrown into a neutral position and the system locks; to reverse, the oil is circulated in a reverse direction and instead of fitting separate brakes to the car it is but necessary to bring the valves into the neutral stop. Ordinary mineral oil of low viscosity is used. The lowest oil pressure used is 200 pounds per square inch and as speed decreases this pressure reaches a maximum of 2,400 pounds per square inch, a fact which requires very careful valve construction.

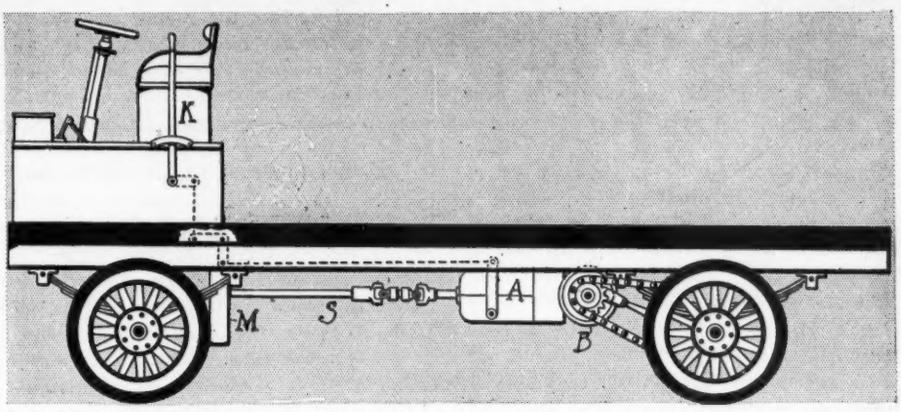


FIG. 3—ELEVATION OF TRUCK WITH MANLY TRANSMISSION

The reported efficiency of this system is approximately 85 per cent, which means that 85 per cent of the power generated in the gasoline motor is transferred to the road drive wheels of the truck; or, negatively reckoning, 15 per cent of that generated power is consumed in the hydraulic pump, motors, piping and valves. This is a high efficiency in comparison with that obtained when power has to be delivered indirectly through double trains of gears, and a noted feature of the Manly hydraulic is that on slow speeds the oil is being circulated slower and the friction losses should be less.

TIRE SERVICE IN FRANCE

Touring in comfortable closed motor cars, such as are becoming more and more common on European roads, seemed likely to be limited by the inability of tires to carry very heavy loads with any reasonable degree of safety. The largest and strongest tires now on the market, with a section of 135 millimeters, cannot be given a load of more than 1,600 pounds if a reasonable length of service is required. A load of 1,600 pounds per wheel gives the heaviest load which should be carried on pneumatic tires. It is true that many powerful closed touring cars, fitted with all the luxuries that human ingenuity can devise, have a rear axle load of about 4,000 pounds. But such a load is only carried at enormous cost in tire upkeep, for the generally accepted rule is that the life of a tire is in inverse proportion to the cube of the weight which it carries. Thus, if the weight is doubled, the wear will, on an average, be eight times greater. An increase in weight of but 5 per cent causes an increase in the wear of the tires of about 14 per cent. The natural conclusion is that weight should be kept as low as possible in the construction or fitting of a car; or if such luxuries as heavy handsomely upholstered closed bodies, electric light, folding tables, self-starters, tire inflators, demountable rims, and the wealth of accessories which have been showered on the motor car, if all these are deemed indispensable, the user of them must be prepared to face a heavy tire bill, for it is weight that kills.

It is with the view of making possible the carrying of heavy loads on pneumatic tires that the plan has been brought forth of mounting two, three or four tires on one rim. Two or three attempts in this direc-

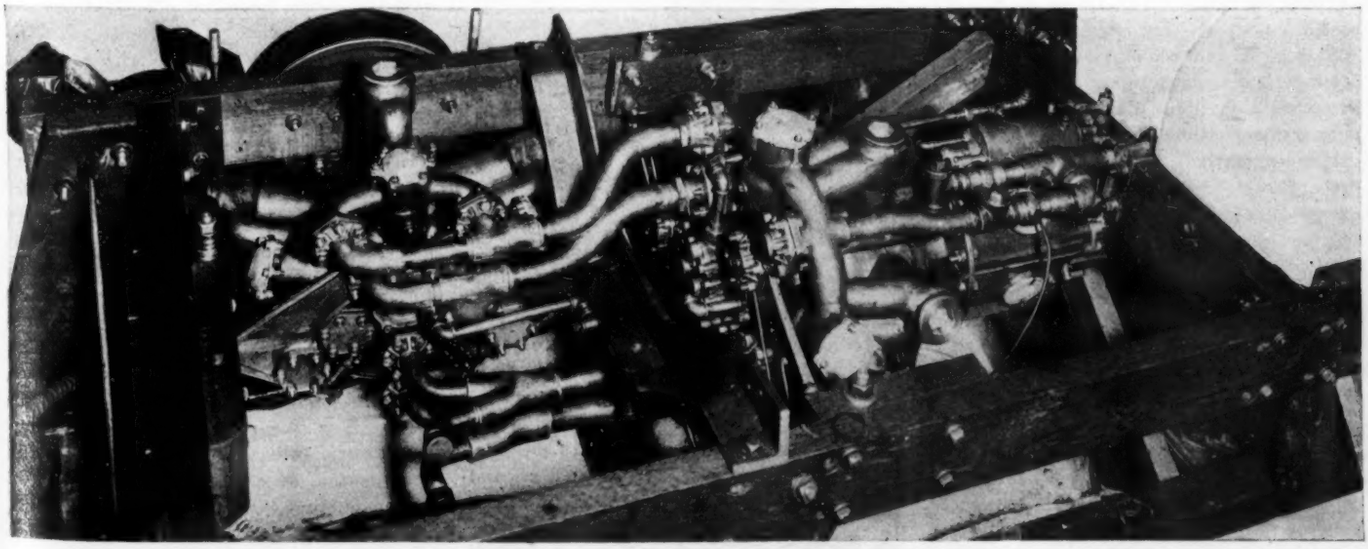


FIG. 4—AS OIL PUMP AND MOTOR APPEAR IN TRUCK WITH MANLY TRANSMISSION

tion were shown at the Paris salon, the most conspicuous being presented by Vinet and Michelin. Even more important than the case of the costly pleasure car is that of the commercial vehicle, for it has been abundantly proven that the excessive vibration set up with steel or solid rubber tires, where fast running is necessary, is ruinous to mechanism. European commercial vehicle competitions have all proved the wheels and suspension to be the weak points of motor cars carrying loads of more than 2 tons. As long as the speed is kept reasonably low not much harm is done; but too many drivers are not content with a maximum of 15 miles an hour on steel tires, with the result that the car goes to pieces long before it should. There is an example in the Paris omnibuses, which are mounted on solid rubber block tires, are run at as high a rate of speed as possible over roughly-paved streets, often being made to compete in speed with the subway trains. The result is that out of a fleet of 162, it is never possible to have more than ninety-seven in service, the remaining sixty-five being in the repair shop and requiring the attendance of about 200 mechanics and fitters. One of the Paris taxicab companies, which in 1902 started out with cabs having steel-shod wheels, had an average of 7 per cent broken crankshafts a year; the proportion on pneumatic tires was ½ per cent.

Speed Is Too Great

It is believed, therefore, that if such commercial vehicles as are obliged to maintain a speed of 15 miles an hour or more, could be fitted with pneumatic tires in place of solid rubber or steel rims, there would be a considerable lengthening of the life of the vehicles by reason of the lessened vibration. Naturally, in the case of heavy trucks, with loads of 6 to 8 tons, and required to maintain an average speed of 6 or 7 miles an hour, there is nothing to be gained by an attempt to fit pneumatic tires. The advantage, however, is indisputable for passenger buses, and delivery vehicles carrying an axle load from 1,000 to 3,000 pounds.

The twin and triple tires produced by Michelin, and now being given a public demonstration on a Paris omnibus, were only made possible by the advent of the demountable rim. If the inside one of a set of three or four tires on one rim required changing on the road, it is easy to see that the old system of wrenching each shoe over the fixed rims would not appeal to the passengers in the bus or to the shareholders of the company. The demountable rim was therefore indispensable. Where intended to be used in sets of two or more, on a vehicle that does not exceed, on an average, a speed of 15 or 16 miles an hour, it was possible to strengthen the tire in a way that would not appeal to the fast-traveling tourist, but which was excellent for the utilitarian vehicle.

The demountable rim used on the Michelin consists, like the racing rim, of one fixed rim on the felloe of the wheel, and a split demountable, the two ends of which are drawn together to bind it on the wheel. On the racing and ordinary touring models this binding is obtained by a turnbuckle—a system that has proved its worth in races on condition that the rim is screwed up as tightly as possible; some French drivers forgot this at Dieppe, and suffered in consequence. On the twin and triple tires there are two flattened portions of the fixed rim, one of these being pierced to receive the valve, and bearing also a couple of stops, corresponding with similar stops on the demountable rim, the object of which is to prevent creeping and facilitate mounting.

Description of Scheme

Through the other flattened portion is passed a hardened steel stud, bored to take a bolt, and itself secured in position on the face of the rim in just the same way as a security bolt. A T wedge fits on this flattened face, and between the two rims, the stem of the T screwing into the stud just mentioned, and the two arms of the T, forming wedges, each engaging with a steel stud riveted onto the inner face of the demountable rim, at each side of the split. The further the wedge is screwed in the closer the two ends of the rim are brought together, and the tighter the whole is bound on the wheel. To dismount the rims the outer wedge is first withdrawn and a pair of forceps, employed to force the two ends apart sufficiently to allow the rim to be lifted off. The projecting stud is taken off and the second tire treated in the same way. The operation is naturally longer than with the racing rim, but it should not occupy under ordinary working conditions, more than 10 minutes to dismount all three rims from a triple tire.

Dual Tire System

After tests extending over 2 years—the delay in placing on the market was principally on account of the demountable rim—it is declared that two or three tires working side by side last from three to seven times longer than a single tire, with an equal load, working alone. The Paris bus now in service with these rims has three tires on each of the back rims, and two on the front wheels. The weight of the vehicle, with eleven passengers, driver and conductor on board, is about 8,800 pounds. The bus is of a special type, with an armchair for each passenger, and luxurious fittings.

MOTOR FIRE ENGINES FOR PARIS

All horses have to be dismissed from the city of Paris fire brigade, and their place taken by gasoline motors. The order has been given by the municipal council after 2 years' close experimenting with mechanically-driven engines and fire tenders, and would be put into force immediately, were it not for the heavy cost. There are at present seventy-six horse-drawn fire engines in the city of Paris, costing annually a sum of $64,000; if they could all be immediately transformed into gasoline engines the annual upkeep cost to the city would not exceed $17,400. Such a transformation, however, would entail an outlay of $320,000, and in view of this amount it has been decided to spread the operation over a period of 6 years; thus in 1914 there will be no more horse fire engines in Paris and the city budget will only have been taxed to the extent of $72,000. Electricity as a motive power has been given a trial, but has not been found sufficiently satisfactory. The best type of engine is a four-cylinder gasoline motor, having a capacity of nearly 400 gallons a minute as compared with 220 gallons from the best of the present horse-drawn steamers. A greater number of men can be carried, and the speed is so much higher that frequently the gasoline engine has extinguished a fire before the horse-drawn tender arrives on the scene.

FIRST ALCOHOL MOTOR CAB

The first alcohol motor cab has made its appearance in New York. It is the product of the factory of the H. H. Franklin Mfg. Co., in Syracuse, N. Y., where the engineers have long been experimenting to provide an alcohol motor that would give results equal to those of the gasoline motor. The result sought has been attained, it is claimed, for the engine was tested over hundreds of miles of road before being sent out from the factory and it is asserted it has demonstrated a capability of covering as great a distance for each gallon of alcohol as other motors of like size do for each gallon of gasoline. It is predicted that time will show it as the forerunner of a type and that eventually it will have many duplicates in the busy streets of the greater cities. The new vehicle is of 18 horsepower and is identical with the gasoline motor cabs of the 1909 Franklin model except for the provision made for the use of alcohol in place of the gasoline. At first experiments were made with a regular gasoline engine, but after a study of its action an engine was made specially designed for alcohol, and it is this with which the new cab is propelled. Alteration is made as to compression and carburation. The alcohol is found to produce no bad effect upon the motor, it is said. The problem of making a workable alcohol motor has been the subject of attention on the part of the governments of France, Germany and the United States. The Franklin cab has been turned over to a Franklin customer in New York, and in service it is now to demonstrate its everyday practicability. There are already, it is estimated, over 500 gasoline motor cabs of the landaulet type in New York city, and the number is expected to double by spring.

Legal Lights and Side Lights

NEW LAW FRAMED UP

THE first result of the recent conference of governors and governors-elect of New England is embodied in a new motor law which has been prepared under the direction of the Massachusetts highway commission and submitted to Governor Guild, of Massachusetts. It is really a codification of existing motor laws in New England. Of course it has some good features. But down near the end and where it apparently will attract little attention comes the most important part of the whole thing—the introduction once more of that old hoary chestnut, taxation of motor cars according to horsepower. This time it is in a slightly altered form, however.

For 3 years this plan has been persistently introduced in the Massachusetts legislature and it has been fought principally by a few people, mostly the newspaper writers, and there was talk that it had been buried for the coming year. Now it is back again and there will be the same old fight over again, but this year it will be more bitter than ever. The men interested in the motor industry will have this advantage—they may be able to get to work earlier and fight it. The new plan proposes a tax according to the horsepower based upon 50 cents per horsepower, and there is woven in ingeniously the statement that on a large mileage there will be such a small tax that the motorists will not mind it. No account is taken of the principle of the thing. And when the figures are given out it will be found that there will be a larger tax on cars than was proposed under the old plan of from $5 to $15, so the whole thing will be looked upon seriously.

Dealers Will Fight

Last year the legislature nearly got away with the proposition, for the hearing was held just before the show when the motorists were too busy to look after it and only when it was put up to the members on the issue that it was a blow at skilled labor did the committee handling it reconsider its vote. Plans are now under way by the Boston Dealers' Association to take the initiative and get a movement started to fight the proposed bill. The Massachusetts highway commission drafted the proposed bill. It has some good features naturally, but there are some that are really a slap at the industry. Here are the more important of the suggestions:

A limit of 10 days has been adopted for a period during which non-residents of any state may operate a car therein without payment of a registration fee; but a new definition of non-resident makes it such as to exclude all persons who have a regular place of business or abode for 3 months or more during the year within such state; such persons are required to pay registration fees, but they are allowed a special 3-months' registration good for July, August and September, at one-half the regular fee.

Another requirement is that the rear number shall be illuminated at night, but the present Massachusetts regulation requiring lamps to be numbered has been eliminated. This requirement has proved in practice to be of no value, and in many cases it has resulted in hardship.

A provision has been inserted setting forth what shall be deemed to be an adequate brake, this having heretofore been lacking in the laws of all New England states, and is now copied from those of New Jersey. The authority having jurisdiction over motor cars under the proposed act is empowered to refuse or revoke the registration of a car which is found not to have the equipment required by law. A motor car which cannot be operated safely should not be allowed to endanger the lives of other users of the highway.

Youngsters Are Barred

The proposed law fixes a minimum limit of 16 years of age for private operators and 18 years for chauffeurs, and the existing Massachusetts provision that no person shall employ an unlicensed chauffeur has been incorporated. Chauffeurs are defined so that the term will include all persons who receive compensation for services in connection with motor cars, whether directly or indirectly.

It has been found in practice that demonstrators, salesmen and repairmen who are constantly operating cars upon the road, and who often run them at high speed and recklessly, have been operating under private owners' licenses. Under existing Massachusetts law these licenses do not expire yearly, so it has been deemed wise to include a provision that all operating licenses, of whatever class, shall expire each year.

"Dealers" are defined in the new law so as to include persons who rent motor cars. This is done to allow such persons to take out a dealer's license, so-called, instead of obliging them to register and pay a fee for each car which they operate. "Garages" under the new law, include all public garages and clubs where anyone may keep a motor car, and it is required that every garage shall check all motor cars both in and out, so that authorities and owners may ascertain whether a car was in the garage or out on the road at any given time. It will help to prevent the unauthorized use of cars, and will prevent much of the joy-riding which has been found to be conducive to accident.

The proposed law establishes 25 miles an hour as the extreme speed limit, with a provision that a judge may place on file any complaint of excessive speed if in his opinion it was unintentional, or if "no person or property could have been injured thereby." This seems a fair way of meeting both the motorist and the motorphobe, and this maximum was adopted for two reasons. First, at any greater speed a motor vehicle tears up and destroys a macadam road; second, such a maximum speed must be recognized as fair by motorists themselves.

Every motorist realizes that many times one scorcher will start up all the cars ahead of him in attempting to pass them, as they must keep up an unlawful speed or be enveloped in a cloud of dust.

Speed Around Corners

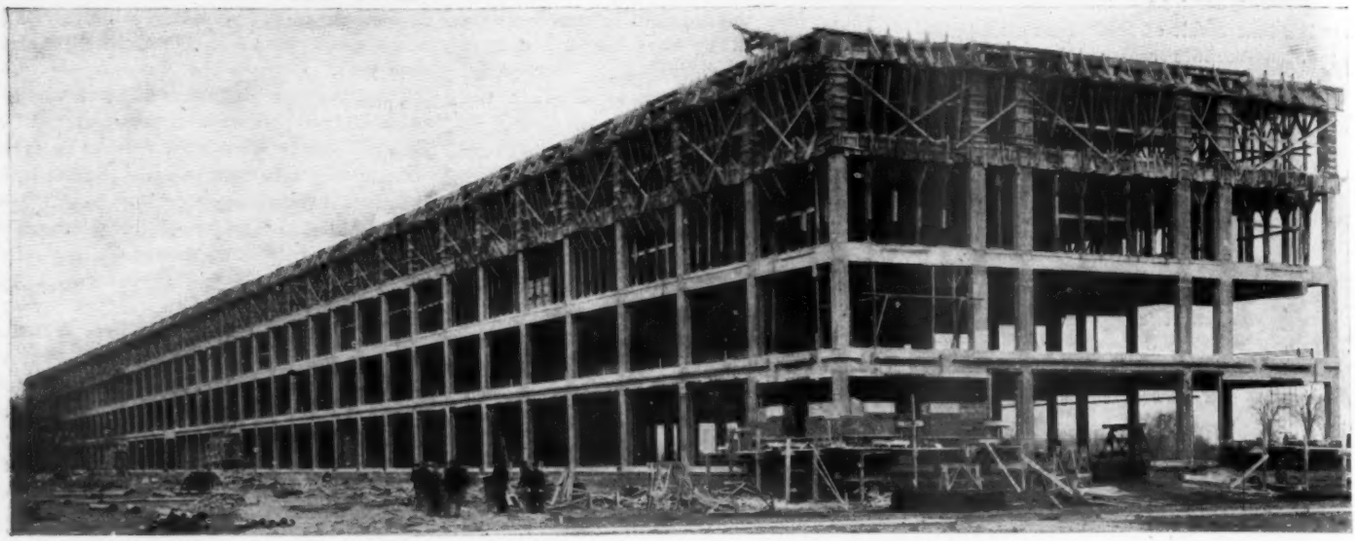
A limit of 8 miles per hour is suggested around corners and curves and at intersections of streets, in order to secure uniform conditions. The new law also provides that local regulations shall not become operative unless approved by the central authority of a given state, this provision also being inserted in the interest of uniformity.

Relative to registration fees, the law provides that they shall be based upon horsepower, this being deemed the factor which most closely governs the damage done by a motor car to a highway, as well as the cost of the car. A uniform fee of 50 cents per horsepower per car, graded in multiples of 10, has therefore been provided in the proposed law. On a basis of 1,800 cars a flat fee of 50 cents per horsepower will raise $22,935, or an average of $12.74 per car. Assuming that motor cars average 5,000 miles a year, an extremely low figure, the license fee for a car under 10 horsepower would be 1-10 of 1 cent per mile, the commission estimates.

Shows Solomon's Wisdom

In the Malden, Mass., police court last week Judge Bruce gave a decision in some cases which showed good reasoning and pleased the motorists who were before him. There were several who had been arrested charged with using chains on their cars going through the parkway, which is a violation of the park rules. Judge Bruce inquired of the arresting officers if there were snow and ice on the ground and he was told there were, so he placed the cases on file because, as he said, chains could not hurt the road under such conditions. He said motorists who used chains must be careful, however, for if they run over bare spots they are liable to the fine which will then be imposed.

Among the Makers and Dealers



PRESENT APPEARANCE OF THE NEW FORD FACTORY NOW IN COURSE OF CONSTRUCTION

New Franklin Salesman—R. K. Swett, formerly with the Pope-Hartford company, has joined the ranks of the Franklin company as a salesman.

Boost For Business Rig—The Indianapolis Motor Car Co. has sold a Rapid gasoline truck to Sander & Recker, retail furniture dealers of that city, making three furniture concerns in that city using gasoline trucks for delivery service.

Another New One—The Hickman-Lauson-Diener Co., to handle motor cars, has been incorporated in Milwaukee, with a capital stock of $20,000. The incorporators are Isaac G. Hickman, of the Hickman-Cramer & Kroll Co., Milwaukee agent for the Cartercar; Claus P. Lanson, builder of motors, and Walter H. Diener.

Velie in Chicago—The Velie Motor Vehicle Co., of Moline, Ill., which recently embarked into the motor car business in addition to manufacturing farm implements, has opened a Chicago branch at 1615-17 Michigan avenue, which will be in charge of H. G. Moore, who recently resigned as secretary of the McDuffee Automobile Co., of Chicago. Mr. Moore will have more to attend to than the Chicago branch, however, for under his direct supervision will be the motor car agents handling Velie cars. He will make his effort in Ohio, Indiana and Michigan to start with, but he also is after a New York agent. In addition to the business looked after by Mr. Moore, the Velie will be marketed through the John Deere Plow Co., of Kansas City; Deere & Webber Co., of Minneapolis; John Deere Plow Co., of Omaha, and the Velie Motor Vehicle Co., of Moline, Ill., which will act as wholesale distributers. The Chicago branch has leased the building now occupied by the Packard agency, which intends moving into a new location in the spring. Mr. Moore will exhibit the Velie at the new Astor house during the palace show.

Opens in Detroit—The Miller Storage Battery Co., of Toledo, has opened a branch house in Detroit, with F. E. Holmes as sales agent and H. F. Greene as technical man. Greene formerly was with the Evansville Battery and Electric Co. as traveling salesman.

Joins Chicago's Row—The S. H. Peterson Automobile Co., formerly of 2253 Cottage Grove avenue, Chicago, has recently moved into the heart of the motor car district in that city and taken up quarters at 1229 Michigan avenue, where it will handle the Waverley electric and the Gyroscope.

Ready for Opening—The Hokanson Automobile Co., of Madison, Wis., western Wisconsin distributor for the Buick, Ford and White, announces that the formal opening of its new $25,000 garage at Madison will take place on Saturday evening, December 26. The main floor affords 10,164 square feet of clear space. It is entirely fireproof and there is not a single post in it. A new line of 1909 models will be exhibited for the first time.

Plant for Sunbury—Sunbury, Pa., is to have a new motor car factory. The first move in the project was made when W. C. Packer bought the old high school building for a syndicate composed of Harry Seebold, Dr. Walter Drumheller, George E. Rohrbach, John V. Lesher, Harry S. Knight, W. R. Rohrbach and himself. As soon as the necessary alterations can be made, machinery will be installed and forty men put to work assembling the new car, for which a name has not as yet been selected. The new company also will act as agent in Sunbury and the surrounding territory for the Locomobile, Matheson, Mercedes, Pope-Hartford and Studebaker electric.

Speedwell Gotham Branch—The Speedwell Motor Car Co. will open, January 1, a branch at 2002 Broadway, New York, which will be managed by John Tugby.

Stromberg Opens Branch—On account of increased business in the New England states the Stromberg Motor Devices Co. has opened a branch in Boston at 319 Columbus avenue, in charge of H. E. Gross. A stock of Stromberg carbureters will be carried and also a full line of fittings for every make of car.

Pope-Toledo Report—The monthly report of Receivers A. L. Pope, G. A. Yule and F. A. Scott, recently filed in the United States circuit court of Toledo shows that an increase in cash deposits was made during November, amounting to $11,090.94 by the Pope Motor Car Co. The total sales for the month amounted to $33,694.94, while the factory payroll was $10,535.64. There was on hand at the close of November a cash balance of $259,492.95. Several deals for the purchase of the plant are pending at this time.

Mitchell Sub-Agency—The Penn Motor Car Co., of Philadelphia, agent for the Mitchell car, has opened a Delaware county branch at Media, Pa., that tight little town with more motorists to the square inch than any place of its size in the Keystone state. J. H. Fleming has been placed in charge. The plant will include a large repair plant, for which there has long been a crying need in Media, and which will be in charge of an expert machinist from the Philadelphia agency. It is understood that this policy of establish-

ing branches in the nearby county capitals will be extended with the idea of providing every facility for Mitchell owners in the Philadelphia territory.

Pittsburg Garage Sold—The garage of the Central Automobile Co., at 5909 Centre avenue, Pittsburg, has been bought by R. E. Dinger and A. H. McKellit, the former owners being C. L. Seeley and C. D. Messneger. The new manager will be Fred D. Tathbun, who was for a long time the Columbia sales agent in Pittsburg.

Vacation for Gunderson—Victor M. Gunderson, ex-secretary, treasurer and general manager of the Northern Motor Car Co., who resigned when the consolidation of that company with the Everett-Metzger-Flanders Co. took effect, has decided to take a vacation and will spend the winter touring Mexico, Florida, Cuba and Puerto Rico. Mr. Gunderson has not made any definite plans for the future.

Ford Plant Nearing Completion—A photograph of the new Ford plant, taken December 10, shows the construction work on the main building, the decorative effects under way, the steam pipes being installed and the window frames partially in. All the space or squares between the upright concrete pillars will be filled with glass. This is the largest concrete building ever erected, it is claimed.

New Quaker Concern—The Franklin Motor Car Co., composed of James Sweeten, Jr., and H. G. Clark, has just been organized to handle the Franklin in Philadelphia. This car has been unrepresented in the Quaker City for the past 2 months or more. The new concern has secured ground at Thirty-fourth and Chestnut streets, where a large concrete building will be erected to accommodate its business. Meanwhile temporary quarters have been established at Thirty-seventh and Spruce streets, just across from the University of Pennsylvania.

Mason Reorganization—The Mason Automobile Co., with a capital stock of $250,000, has taken over the plant, business and good will of the Mason Motor Car Co., of Des Moines, Ia., and in addition to manufacturing the Mason two-cylinder will make a four-cylinder for which much is claimed. Among the features of the new engine will be an aluminum crankcase from which the engine is hung. The cylinders are easily removed and it is possible to clean them without disturbing the crankcase. A. B. Shriver, one of the largest stockholders, is president, general manager and treasurer. He has resigned as president of the Winterset Saving bank and has moved from Winterset, Ia., to Des Moines. H. M. Pattee, is vice president and E. J. Rood, secretary. F. S. Duesenberg, designer of the Mason, will continue as superintendent. E. R. Mason retains his interest and will have charge of the sales department. The board of directors consists of E. R. Mason, A. B. Shriver, F. S. Duesenberg, Ben Mintburn and H. M. Pattee. It is planned to increase the output from 300 to 1,000 cars, the factory being able to turn out three engine equipments a day.

Take Electric Agency—The Pittsburg agency for the Rausch & Lang electric vehicles has been placed with the Mutual Motor Car Co.

New Wilmington Garage—A new garage has been opened by the Wilmington Automobile Co., which handles the Franklin at Wilmington, Del. The building is adjacent to the new Avenue theater at the corner of Delaware avenue and Tatnall street. It has a frontage of 83 feet and a depth of 114 feet. Facing Delaware avenue are the office, show room and stock room. Large storage space with a machine and repair shop is provided on the first floor, while on the second, reached by means of a large elevator, are extra garage facilities.

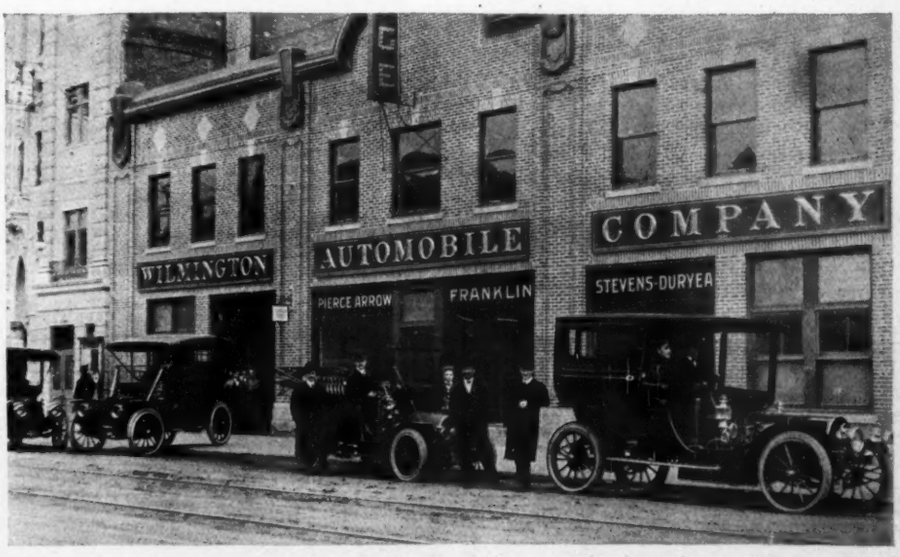
Cameron in New York—The Cameron Motor Co., of New York, selling agent for the air-cooled Cameron cars, will occupy with its general sales offices the entire building at 231 West Fifty-fourth street, on January 1, in charge of Harry W. Doherty as manager. The factories at Beverly, Mass., and New London, Conn., are planning to turn out 2,000 of the air-cooled Cameron fours and sixes in runabouts, baby tonneaus and racers, and will shortly add to these models a taxicab and light delivery car.

Plant for Worcester, Maybe—Worcester, Mass., is to have a motor car factory if the plans of the board of trade do not go astray. The Berkshire is the car that is to be manufactured there. The Berkshire was located in Pittsfield up to a few months ago, when the panic caused the shop to shut down. The board of trade has requested John P. Coughlin, president of the Worcester Automobile Club, to cooperate with it and secure the industry for Worcester. Mr. Coughlin has met with much success in his canvass among Worcester business men to bring the company here. The car will be called the Worcester-Berkshire.

Will Make Buggies—It is reported that the Atlas Engine Works, of Indianapolis, will appear in the role of a motor buggy manufacturer for the first time at the New York shows. Until that time, it is understood, the company will make no formal announcement that it is to engage in the manufacture of motor vehicles. It is said the engine will be two-cylinder opposed, located under the body and developing about 12 horsepower. Later, it is said, the company will make a similar vehicle equipped with a 16-horsepower engine.

New Job for Drach—Robert Drach, a well known race driver and expert mechanic, up to a short time ago manager of the mechanical department of the Schreiber Motor Car Co., Locomobile agent for Wisconsin, has been selected for manager of the new garage to be erected by Kopmeier Bros. Motor Car Co., of Milwaukee, which will handle the American gasoline and Detroit electric lines in Wisconsin. Arrangements are already being made for formal incorporation and the construction of one of the largest garages and salesrooms in the northwest in the city of Milwaukee.

Stanley Branch in Chicago—The Stanley Motor Carriage Co., of Newton, Mass., has opened a branch in Chicago with Frank Jay in charge. Mr. Jay has handled Stanleys for the past 2 years with the Webb Jay Motor Co., but owing to the increased demand for its cars, the company has deemed it advisable to maintain its own branch in Chicago and make it a distributing point for the entire west. The company now is having built a modern office, salesroom, warerooms and garage combined at the corner of Twenty-first street and Indiana avenue, which it expects to occupy as soon as completed. Until then the branch will be at its present location, 2335 State street.



NEW GARAGE OF WILMINGTON AUTOMOBILE CO., WILMINGTON, DEL.

Brief Business Announcements

Boston, Mass.—The Auto Motor Co. is to open salesrooms at 11-12 Park square.

Des Moines, Ia.—The Buck Auto Co. has just been appointed agent for the E.-M.-F.

Kansas City, Mo.—The Brown Auto Co. is now installed in its new garage on Main street, near spring.

Los Angeles, Cal.—The local Franklin agency is now located in its new garage at Twelfth and Olive streets.

Scranton, Pa.—The Standard Motor Car Co. is to erect a garage in Dupont court, between Mulberry and Linden streets.

Harrisburg, Pa.—The Somerset Automobile Co., of Somerset, has been incorporated with a capital stock of $10,000.

Salem, N. J.—Efforts are being made by capitalists of Bridgeton to form a motor bus line between this city and Bridgeton.

Cleveland, O.—Harry S. Moore, who has the local agency for the Stoddard-Dayton, has been appointed representative of the Brush.

Mt. Clemens, Mich.—Posner has opened a garage in this city and will do repair work in addition to conducting a rental business.

Des Moines, Ia.—Work has been commenced on the erection of the new garage for the Capital Auto Co. at Eighth street and Grand avenue.

Des Moines, Ia.—The American Motor Car Co., which is the agent for the Cadillac, is now located in its new quarters at 916 Walnut street.

San Antonio, Tex.—H. B. Andrews and F. M. Golde have formed a partnership and will go into the motor car business as agents for the Buick.

Paris, Ill.—D. R. Noonan is building a new fireproof garage 40 by 100 feet and one story high, which will be ready for occupancy February 1.

Cincinnati, O.—The Cincinnati Automobile Co., which represents the Peerless, Pope-Hartford and Oldsmobile, is now located in its new garage.

Pittsburg, Pa.—Samuel R. Iams, formerly agent in western Pennsylvania for the Royal Tourist, has joined the local force of the Winton company.

Columbus, Ind.—Ogden & Gant have dissolved partnership. Gant has sold out his share of the business to Ogden, who will conduct the business in the future.

Pittsburg, Pa.—B. S. Von Rottweiler has established factory headquarters at New Kensington and is busy putting on the market a new car, to be known as the B. S. V. R., of which he is the designer. The new company is to be known as the Mercedes Motor Mfg. Co. Mr. Von Rottweiler is to be the president and manager of the new concern.

Buffalo, N. Y.—C. L. Whiting, of Rochester, has been appointed manager of the Buick agency in this city.

Redondo, Cal.—Work has been commenced on the erection of the new plant of the Pacific Motor and Automobile Co., and it will be rushed to completion.

Newark, N. J.—The Greene Motor Car Co. has resigned as agent for the Oldsmobile, and in the future will devote its attention to the locomobile exclusively.

St. Louis, Mo.—The Mississippi Valley Automobile Co., recently organized, has started a taxicab service in this city. J. H. Phillips is the vice president of the company.

Galveston, Tex.—S. E. Jewell, formerly with the Colorado Auto Co., of Denver, and later manager of the Galveston Motor Car Co., has opened a garage at 2210 Mechanic street.

New York—A. T. Demarest & Co., the well known carriage firm, which for the past 20 years has been located at Thirty-third street and Fifth avenue, has leased the nine-story building to be erected by the United States Realty and Improvement Co. at Broadway and Fifty-seventh street.

Pittsburg, Pa.—Application has been made for the appointment of a receiver for the Goodyear Auto Tire Repair Co. A. M. Trauenheim makes the application.

Cleveland, O.—The Crawford Motor Co., 1010 Prospect street, will handle the Jackson, its establishment being in the rooms formerly occupied by Crawford & Soper.

Hartford, Conn.—A petition in bankruptcy has been filed in the United States district court against the Auto Body and Top Mfg. Co. The liabilities are $4,641 and assets $9,513.

Utica, N. Y.—The Utica Motor Car Co. has elected the following officers for the coming year: President, F. P. Miller, vice president, E. P. Otis; secretary and treasurer, G. H. Norris.

Boston, Mass.—The Hoyt Electrical Instrument Works, of Penacook, N. H., has opened a branch at 161 Summer street, to take care of the New England trade. H. F. Kellogg is in charge.

Boston, Mass.—J. H. Cooper, who is the local manager of the Ajax Tire Co., intends to remove from his present quarters on Boylston street to 15 Park square, the change to take place on January 1.

Syracuse, N. Y.—The Chase Motor Wagon Co. has been reorganized, and William H. Durphy has been appointed secretary and director of the new company. He is to be in charge of the sales department.

New London, Conn.—The W. D. Forbes Mfg. Co., which is engaged in the manufacture of motors and specifications, has just erected a new plant at Fort Heck, and has commenced manufacturing operations.

Oklahoma City, Okla.—The Midland garage at 25-27 West First street, has been purchased by C. P. Cory, who will sell cars and also conduct a livery. V. E. Crouch, of Chicago, will manage the garage.

Council Bluffs, Ia.—The Bertschy Motor Co. has awarded the contract for the erection of its new factory and shop. Work is to be commenced at once and it is expected to be ready for operation by the first of the year.

Denver, Colo.—A taxicab company has been organized here, to be ready for operation by the first of the year. F. A. Austin is the president, E. W. Reynolds, vice president, and B. J. Reynolds, secretary, treasurer and manager.

Atlanta, Ga.—The B. F. Goodrich Co. has secured offices at 64 South Pryor street, and will locate its headquarters there. E. V. Wilkinson is to act as manager of the new branch, which is to be open for business December 15.

New Haven, Conn.—Wheeler & Wuestfeld Co.; capital stock $4,500; to deal in motor cars and motor boats.

Jackson, Mich.—B. M. Byrne Garage Co.; capital stock $15,000; to deal in motor cars.

Denver, Colo.—La Junta Automobile Co.; capital stock, $10,000; incorporators, R. S. Anderson, G. H. Little, K. Posz.

Chicago—Randolph Motor Car Co.; capital stock, $300,000; to manufacture motor cars and accessories; incorporators, E. C. Gage, N. W. Burgstresser, S. Hytowitz.

Aurora, Ill.—Bell Carburetor Co.; capital stock, $12,000; to manufacture motor accessories; incorporators, H. E. Evans, E. R. Conklin.

Lexington, Ky.—Lexington Motor Car Co.; capital stock, $50,000; to deal in, rent and repair motor cars; incorporators, Kinzea Stone, F. F. Bryan and Benjamin Stone.

Belfast, Me.—Reed Garage and Manchine Co.; capital stock, $100,000; to conduct a garage and machine works; incorporators, C. E. Reed, H. Chenery.

Boston, Mass.—George H. Dunham Co.; capital stock, $25,000; to do a general motor car business; incorporators, George H. Dunham and F. C. Dole.

Cleveland, O.—General Auto Carriage Co.; capital stock, $10,000; incorporators, W. E. Crittenden, C. T. Laughlin and F. A. Bishop.

New York—Self-Loading Wagon Co.; capital stock, $25,000; to manufacture motors, engines, machines, cars, carriages, wagons, boats, etc.

Dover, Del.—M. T. D. Motor Parts Co. of Philadelphia; capital stock, $25,000; to manufacture and deal in motor vehicles of all kinds.

Watertown, N. Y.—Woodruff Garage Co.; capital stock, $1,000; to manufacture motors, engines, machines, cars, etc.; incorporators, H. G. Kubel, T. A. Mathews, Watertown, and J. E. De Friend, Black River.